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SHIPPING BILL RECOMMENDED FOR PASSAGE.

Advocates of the shipping bill estimate that its expense to the government if it becomes a law will be as follows:

Postal subsidies—Maximum annual cost on the Pacific, $2,335,000; maximum annual cost on the Atlantic, $2,335,000; total cost of the American mail service, $4,700,000; annual receipts from all ocean postage, $3,000,000; annual deficit under the proposed system, $1,700,000; annual deficit under the British and colonial system, $2,188,111.

General subsidies—Total cost based on the number of vessels in foreign trade in 1900, $1,072,000; annual cost of deep sea fisheries bounty, $175,000; total annual cost to the government under all sections of the bill, $5,947,000; additional auxiliary merchant cruisers, if the bill becomes a law, forty-two.

The senate committee on commerce has reported the bill to the senate by the strict party vote of ten to six. The bill has been scheduled upon the senate calendar for consideration after the canal question is settled. Several of the senators are of the opinion that the bill will pass. While an endeavor will be made not to make the bill a party measure, still it is quite likely that party lines will be drawn when it comes to the vote. Only one important amendment was made before the bill was reported to the senate. This amendment relates to section 6 of the general subsidy paragraph, and provides that the secretary of the treasury shall pay as subsidy on each entry, not exceeding sixteen entries in any one fiscal year, and for a period of five years from the date of registration, one-fourth of one cent per gross registered ton for each 100 nautical miles sailed to ships of over 1,000 gross registered tons. The original bill stipulated that such payments should be made to ships of over 1,500 tons only. The amendment, therefore, will include a vast number of vessels not included in the operations of the bill as framed and reported to the committee upon introduction to the senate. The bill, as agreed upon, grants subsidies amounting to over $9,000,000 a year to the American merchant marine. The bill is accompanied by a voluminous report, the substance of which is as follows:

The purpose and reasonably certain results of the bill in ten years will be to establish the maritime supremacy of the United States in trade with Asia and in the Gulf of Mexico and the Caribbean; to establish securely trade between the United States and South American republics, and to give the United States a respectable representation on the North Atlantic. It will so extend ship building as to transfer in time from abroad to the United States the center of that industry, as the centers of other industries recently have been transferred. Finally, it will give to the United States a measure of maritime independence corresponding to our industrial and agricultural independence.

The postal subsidy provisions enable the postmaster general to establish an American ocean mail system superior to the systems of Great Britain, France and Germany. This policy was declared ten years ago. The bill corrects errors in the act of 1891, in the light of the decade's progress in ship building and of changed political and commercial relations of the United States with the rest of the world. It does not increase pay under existing mail contracts, some of which have ten years to run. The American ocean mail system outlined contemplates on the Pacific weekly mail services to Hawaii, the Philippines, Japan, China and Hongkong, and a fortnightly service to Pago Pago, New Zealand and Australia. The maximum cost would be $2,335,000. The services would be performed by American vessels in speed and tonnage far superior to those by which Great Britain, Germany and France now maintain mail connections with Asia and Australia at an annual expense of $4,800,000. On the Atlantic the bill contemplates semi-weekly mail services to Jamaica, Havana and Europe, weekly to Mexico, once in ten days to Venezuela, and fortnightly to Brazil, at a maximum cost of $2,365,000.

The establishment of this complete American ocean mail service, involving much ship building, will require several years. It will render the United States as independent of foreign powers for its ocean mail service as is Great Britain. The cost of the American service by American mail steamers will be $4,700,000; the cost of the British and colonial service by British mail steamers is $4,700,000. Receipts from ocean postage by the United States are now estimated at $3,000,000. The annual deficit under the new American system proposed, including minor services, will be about $2,000,000. The annual deficit under the British and colonial system is $2,188,000.

The report compares in detail American services proposed with British services, and asserts that the bill will revolutionize in American favor, as against the Suez route, the world's ocean mail connections with China and Japan, and will affect Australian connections. It will give the United States forty-two auxiliary merchant cruisers, compared with Great Britain's fifty. Even if expenses of the American ocean mail system should exceed receipts by $2,000,000, in view of the large national and commercial interests served thereby the expenditure will be abundantly justified.

The second part of the report deals with the general subsidy to all American vessels, steam and sail, except mail steamers. It quotes President Roosevelt's message, showing that the cost of building American ships is greater than abroad, that American wages on shipboard are higher and that the government should remedy these inequalities. Discriminating duties, export bounties and subsidies based on export cargoes are in violation of our international obligations, so direct subsidies is the only practical method. The subsidy proposed is not a naked bounty, for it is based on public services to be rendered in return. Americans have absolute free trade in foreign-going ships, so no ship builders' trust is possible under the bill. Ship builders can import now free of duty materials for ships for foreign trade, so no combination to raise prices of materials is practicable. If an American ship owner will build his vessel in the United States, employing home labor, employing American officers and crews, performing certain services for the American government and using the vessel to promote American commerce, he will be paid a subsidy sufficient to put him on an equality with the foreign ship owner employing foreign labor and serving a foreign government.

The average cost of building ocean steamers, mainly for cargo, is $102 per ton in the United States and $76 in Great Britain. Average monthly wages on ocean steamers, mainly for cargo, are, American, $36; British, $26; German and Scandinavian, $17. The general subsidies proposed equalize American and foreign costs on these bases.

The bill will promote the building of new vessels of large carrying capacity which promote export trade at low freight rates. Combined with our geographical position, it gives special advantages to American vessels in the Pacific trade. Based on actual navigation of American vessels in foreign trade in 1900, the subsidies proposed would amount to $1,072,000, divided as follows: Steam (excluding mail vessels), $559,000; sail, $513,000; geographically—Atlantic ocean, $444,000; Pacific ocean, $467,000; square-rigged ships on both oceans, $161,000. Full compliance with all requirements for the bill would fix the initial expenditures at between $800,000 and $900,000. Under the general subsidy increase in expenditure depends on increase in ship building. The completion of 200,000 tons of ocean steamers for foreign trade in one year, involving $1,300,000 in subsidies, will place the United States in advance of Germany as a ship building nation.

The deep-sea fisheries bounty is to encourage an industry which from the battle of Lexington to the battle of Santiago has furnished more men proportionately for the national defense than any other American industry. The annual expenditure is estimated at $175,000. This amount offsets $160,000 paid to promote fisheries by Canada, which uses for the purpose the annual interest on $5,500,000 paid by the United States to Canada under the Halifax Award in 1878. For seventy years the United States paid bounties to deep-sea fishermen.

The president of the United States has general supervision of regulations to enforce the act.

IRON ORE AND LAKE FREIGHTS.

Representatives of the large iron mining companies of the Lake Superior region, who have been meeting in Cleveland during the past few days, have concluded that it is not possible to bring about an agreement regarding output and prices of iron ore to come this year from the big producing district of Minnesota known as the Mesabi range. The main difficulty in the matter of fixing tonnage from the Mesabi is the number of ten-year contracts made some time ago with several furnace interests at what would now be regarded as low prices. It has practically been decided that the base price for old-range Bessemer ores, on which agreements have been made for several years past, will be the same as last year, $4.25 a ton. Freedom of output from the big mines of the Mesabi is, of course, regarded as favorable to the vessel interests. Probably the meetings of the past week will hurry a settlement of the question of season contracts with the ships for transportation of the ore. If the vessel owners who say they will not accept last year's rate—80 cents from the head of lake Superior—are in earnest, they have nothing to fear in conditions attending all branches of the iron and steel trades. Advances in both pig iron and finished material for delivery extending well into the future have again been recorded within the past week, with the markets strong all around, but badly hampered, as far as the blast furnaces are concerned, on account of inadequate coke supplies, due to car shortage.

TO SELL ARMY TRANSPORTS.

Secretary Root has prepared a bill providing for the abolition of the army transport service and authorizing the war department to sell the transports and contract with private companies for the transportation of troops and supplies. There is one obstacle in the way of the sale of the transports which the bill proposes to overcome. Owing to the fact that nearly all the vessels are foreign-built and were purchased of foreign owners they have no American registry. The bill proposes to grant American registry to each of the transports. It is understood that Mr. J. J. Hill is planning to secure the contract for the carrying of government supplies to the Philippines, which will be the forerunner of a greatly augmented commercial service on the Pacific.

NEW ORDERS FOR COAST SHIP YARDS.

The Newport News Ship Building & Dry Dock Co., Newport News, Va., has just been awarded contract to build a single-screw steamship for the Old Dominion Steamship Co. of New York at a cost of about $600,000. The steamer will be larger than the Hamilton, Jefferson and Princess Anne which are the latest additions to the Old Dominion fleet, and will be the finest vessel in the Atlantic coast service. Her dimensions will be: Length, 366 ft.; beam, 42 ft.; gross tonnage about 4,200.

It is reported from Philadelphia that the Standard Oil Co. is asking for bids on a 7,000-ton tank steamer and that the Mallory line and Merchants & Miners' Transportation Co. will also be in the market shortly for new ships.

Officers of the Republic Iron Co., one of the oldest of the Lake Superior mining concerns, elected at the annual meeting held in Cleveland a few days ago, are as follows: President and treasurer, W. D. Rees; vice-president, Samuel Mather; secretary, William B. Castle; directors, H. B. Perkins, G. W. R. Matteson, Samuel Mather, Peter White, J. V. Painter, W. D. Rees, N. M. Kaufman, A. Hart, W. F. Dummer.

Efforts to combine dredging interests of the lakes have been given up, mainly on account of unfavorable conditions in the money market of late for combinations of this kind. The scheme is dead.

SHIP YARD NEWS—PHILADELPHIA AND VICINITY.

Philadelphia, Jan. 22.—The torpedo boat destroyer Bainbridge, built by the Neafie & Levy Ship & Engine Building Co. of this place, is generally considered to have been unsuccessful on her recent official trial run in the Chesapeake bay. The vessel did not make her contract speed of 29 knots and was remiss in other features of the strict requirements. But an entire or partial failure of this species of craft does not astonish ship builders in this locality. It is a known fact in such circles that the Neafie & Levy Co. did not approve of the design of the Bainbridge or of her sister ships Barry and Chauncey. It has been found that the displacement of these vessels is greater than that indicated by the calculations accompanying the drawings from which the builders have to work. There is no question but that the ship building company labored faithfully to make a success of the trio of destroyers, notwithstanding the fact that their operations were hampered from time to time by changes which the government considered necessary in the original plans. The Bainbridge, Barry and Chauncey have been severely criticized as of faulty design, and several months ago there was a disposition, even among the naval officers on duty here, to exonerate the builders in the event of failure. Serious defects have been discovered on every one of the twenty-six torpedo boats and torpedo boat destroyers built for the government, mainly in that they are deficient in their speed requirement. The official data of the trial of the Bainbridge is not as yet available. Those interested in the successful performance of these vessels say that the Chauncey, now ready for her trial trip, and the Barry, which is still on the ways, may demonstrate that they can be accepted.

A rather serious problem is confronting the William Cramp & Sons Ship & Engine Building Co. in regard to armor plate needed to complete the battleship Maine. Tardiness in the delivery of this important adjunct has ever been a source of annoyance to the great Kensington ship yard. It is feared that this will be intensified in the instance of the Colorado and Pennsylvania, on which the preliminary work has been very rapid. The Cramp company makes no secret of its resolve to render a bill against the government for every hour of the delay occasioned them from this source. In the instance of the battleship Alabama their claim was nearly $250,000. Since the time when the construction of the Alabama was in order the armor plate mills have not materially increased their output, so it is logical that delay in the instance of the three ships mentioned is inevitable.

Officers of the United States Steamship Co. in this city are as yet unable to state definitely to whom all of the contracts will be let for the construction of ten steamships to be added to its line. The Bath Iron Works will build two of the vessels at an estimated price of $510,000 each. Two will go to the Maryland Steel Co. and two others to the Delaware. In all probability either the Cramps or the Harlan & Hollingsworth Co. will secure the latter. The new line will trade between the principal United States ports on the Atlantic seaboard to Cuba and the West India islands. The new vessels will be fitted with refrigerators and all recent devices for the rapid handling of freight. Spacious quarters will be provided for passengers.

It is interesting to note that the statistics of the oil export trade as compiled by your correspondent at the request of the local branch of the Standard Oil Co. indicate that Philadelphia now leads the world as a distributing center for petroleum. The exports since Jan. 1, 1902, have been 14,758,470 gallons, which is an increase of 1,694,965 gallons over the corresponding period of last year. The exports of last week were 6,533,847 gallons. At present thirty-five vessels are in port to load oil for Europe and the far east. The list includes seventeen tank steamships, four ships, thirteen barks and one schooner.

PRODUCTION OF PIG IRON IN 1900.

The production of pig iron in Pennsylvania by districts in 1900 was as follows: Lehigh valley, 545,198 tons; Schuylkill valley, 441,118 tons; Upper Susquehanna valley, 141,123 tons; Lower Susquehanna valley 538,-209 tons; Juniata valley, 126,424 tons; Shenango valley, 800,214 tons; Allegheny county, 3,118,761 tons; Western Pennsylvania, except Allegheny county and the Shenango valley, 651,466 tons; charcoal (whole state), 3,422 tons; total, 6,365,935 tons.

Allegheny county produced more than one-half the pig iron made in Pennsylvania in 1897 and 1898 and more than one-fourth of the country's production in each year, but in 1899 it made slightly less than one-half the production of Pennsylvania in that year and considerably less than one-fourth the country's production. In 1900 it again made less than one-half the production of Pennsylvania and less than one-fourth the country's total production, its production in 1900 being 136,917 tons less than in 1899, although the country's total production in 1900 was 168,539 tons more than in 1899.

The Shenango valley increased its production 167,538 tons in 1899 over 1898, but its production in 1900 was 137,001 tons less than in 1899; Western Pennsylvania, outside of Allegheny county and the Shenango valley, lost 24,761 tons in 1900 as compared with 1899; the Lehigh valley gained 117,549 tons; the Schuylkill valley gained 18,771 tons; the Upper Susquehanna valley lost 22,111 tons; the Lower Susquehanna valley lost 22,511 tons; the Juniata valley gained 14,347 tons; charcoal lost 309 tons.

The production of pig iron in Ohio in 1900 by districts was as follows: Mahoning valley, including the Leetonia furnaces, 1,002,362 tons; Hocking valley, 50,501 tons; Lake counties, 497,584 tons; miscellaneous bituminous, 667,811 tons; Hanging Rock bituminous, 244,916 tons; Hanging Rock charcoal, 7,737 tons; total, 2,470,911 tons.

The increase in the Mahoning valley in 1899 over 1898 was 162,831 tons, and in 1900 the increase over 1899 was 70,197 tons; in the Lake counties the increase was 32,888 tons, against an increase in 1899 over 1898 of 75,820 tons; in the miscellaneous bituminous district there was a decline in 1900 of 56,625 tons as compared with 1899; in the Hanging Rock bituminous district there was an increase of 20,774 tons; in the Hanging Rock charcoal district an increase of 1,261 tons; in the Hocking valley an increase of 24,204 tons.

The production of pig iron in the Mahoning valley in Ohio and in the Shenango valley in Pennsylvania in 1898 was almost exactly the same, the former producing 769,334 tons and the latter 769,677 tons. In 1899 the Mahoning valley, including the Leetonia furnaces, made 932,165 tons and the Shenango valley made 937,215 tons. It was a close race in these valleys in both years, with the Shenango valley slightly ahead. But in 1900 the Mahoning valley went away ahead of its rival, producing 1,002,-362 tons, against 800,214 tons in the Shenango valley. In 1901 the Shenango valley has increased its pig iron capacity.—Bulletin of the American Iron and Steel Association.

PRACTICAL TEST OF FUEL OIL.

Particulars are published in the German papers of results obtained in a practical test of the value of fuel oil in the generation of steam on an ocean steamship, recently made in the case of the North German Lloyd vessel Tanglin on a voyage from Singapore to Sydney, a distance of nearly 5,500 miles. The Tanglin was chartered to convey to Kerguelen island the dogs, equipments and coals for the German Antarctic expedition. She is a steamship of about 2,000 tons capacity, built last year for the North German Lloyd by Workman, Clark & Co., Belfast. She was intended for the East Indian trade and was fitted with apparatus for burning oil and saving labor in the stokehold. Her ordinary bunkers are used for the storage of the oil, all apertures being closed and made water-tight, and the oil is pumped in from craft lying alongside. The oil used by the Tanglin came from Borneo and was taken on board at Singapore. By the method adopted on board this boat the oil is converted into spray and blown on the grates by means of injection-tubes and nozzles pierced with fine holes. The service of only one man is required in feeding the fires, and the supply of oil and the steam pressure are always directed to the required point by means of special valves. The Tanglin's bunkers are so constructed that they can be used either for coal or oil.

Compared with the old system of coal-stoking the following results were arrived at: The weight of each day's supply of fuel was much less, and a great saving of labor was effected, inasmuch as only one man per watch was required instead of five. The Tanglin took 350 tons of oil on board for her voyage (her capacity for coal is 300 tons), and with a consumption of 13 tons per day an average speed of 11½ knots per hour was attained. This means an increase in the speed amounting to a knot per hour. The most disagreeable task connected with coal-stoking is cleaning out the furnaces; when oil is used there is no cleaning to be done.

The chief engineer on board the Tanglin expressed his entire satisfaction with the result obtained. He is of opinion that liquid fuel will soon be extensively used on board great ocean steamships and in his report to the directors of the Lloyd company he strongly advocates the adoption of the new method. The Tanglin used coal on her outward voyage as far as Singapore and after shipping oil there she proceeded to Bangkok, consuming 13 tons of oil daily, against 18 tons of English and 20 tons of Japanese coal. The report adds that the oil gives off no odor and that the heat in the engine room was quite insignificant, while the required pressure of steam was maintained with ease. As regards the cost, the oil was put on board at Singapore at 30 shillings per ton and the whole quantity—350 tons—was got into the bunkers in three-quarters of an hour. The cost of coal at the same port, brought alongside, was 25 shillings per ton.

The mere comparison of the daily expenditure for fuel, namely, 20 tons of coal at 25 shillings, equal to £25, against 13 tons of oil at 30 shillings, equal to £19 10s, a saving of £5 10s per day in favor of fuel, does not represent the whole gain to the ship owner. There is the extra freight that he may earn as represented by the difference between 13 tons and 20 tons deadweight of daily consumption, which, on a twenty days' run would be equal to 140 tons. There is also the extra measurement cargo which he may carry by stowing the fuel oil in the ballast tanks and peaks and there is the saving of firemen and of time in bunkering ports. It is evident that 350 tons of oil bunkers taken on board in three-quarters of an hour can find no near comparison in the case of any recorded instance of coal bunkering and the cleanliness of taking on board liquid fuel in comparison with dirtying the decks and passenger accommodation due to coal bunkering is also an appreciable financial asset upon routes where passenger competition is at all keen. The extra speed of the Tanglin when using oil fuel illustrates the experience that has been reported in respect of other vessels, namely, that boilers which are hard to steam with coal become quite easy to steam with oil on account of the greater intensity of the heat generated by the new fuel.

REAR ADMIRAL SAMPSON DYING.

Rear Admiral W. T. Sampson is a physical wreck. He has been failing rapidly during the past few months and is now confined to his bed. Much of the time he fails to recognize those about him, even his wife. The end seems only a question of a very little while. The sad and tragic circumstances surrounding the passing of this man seems to justify the assertion that republics are ungrateful. The people, as a rule, are an unthinking lot and popular approval is not always the criterion of merit. Go into any theater in the country or stand in any crowd in the public forum and let Sampson's picture be shown and it will be generally hissed. And yet this man planned the campaign and executed the blockade which resulted in the destruction of Cervera's fleet off Santiago. The mere fact that his flagship was temporarily absent is an unimportant detail. The battle was his.

F. W. Carlton of Bath, Me., has closed a contract with the Eastern Ship Building Co. of New London, Conn., for building the outboard launching ways for the two large cargo and passenger steamships that are being built for the Great Northern Steamship Co. for duty on the Pacific coast. These launching ways extend about 250 ft. into the river, and will cost about $50,000. Mr. Carlton will also build for the New London company a very large mooring wharf, extending out into the river about 550 ft. from low water mark. This wharf will cost in the neighborhood of $20,000.

A contract has been signed for the construction at the Brooks ship yards, East Boston, of a six-masted wooden schooner for a syndicate managed by Capt. Crandall, formerly steamboat inspector at Boston. The schooner will be built from designs by W. S. Burgess and will be named for his father, Edward Burgess. The vessel will carry about 6,000 tons of coal and will cost about $175,000.

DRY DOCK AT ST. JOHN, N. B.

A committee from the city of St. John, N. B., recently made a tour of the dry docks of the United States with a view to establishing a dry dock at St. John. The committee consisted of Messrs. William Christie, Robert Maxwell and R. H. Cushing. Throughout the trip they were accompanied by Mr. George Robertson, member of parliament, Louis Coste of the public works department of Canada, John H. Thompson of the firm of William Thompson & Co. of St. John, and Mr. William E. Simpson of the Simpson Improved Dry Dock Co. The committee visited the Erie basin and navy yard dry docks in Brooklyn, the Cramp works in Philadelphia, the Newport News works at Newport News, Va., and the William Simpson & Sons Co. dry dock in Baltimore. The committee's report is quite comprehensive and indorses without reserve the wooden dry dock with stone and concrete entrance. The report says:

"The Erie Basin Dry Dock Co. has two dry docks in Brooklyn, built of hard pine. No. 1 was built of spruce (owing to war) in 1864 and has since been renewed with hard pine and is in good condition; it is 510 ft. long with draught of 22 ft. on sill. No. 2 was built in 1865 of hard pine and only the flooring has been renewed and the dock is now in good condition. It is 600 ft. long with draught of 25 ft. on sill; has just handled four ships in three days. Can pump out the dock in 1¾ hours. Passenger steamer New York (12,000 tons), now in dock undergoing extensive repairs, which will cost $1,500,000. The two docks handle about 400 ships per year; about 3,000 men employed. Mr. Dickie, the manager, favors wooden docks as a commercial enterprise. Mr. McGilvray of Pictou, N. S., is dock foreman. He has been there twenty years. He says that for St. John climate he would strongly urge wood docks, not stone or concrete. Rise and fall of tide about 3 ft. At Erie Basin we also saw two floating docks.

"The United States government has three dry docks at Brooklyn. No. 1, a granite dock, 340 ft. long, cost about $2,000,000 and costs considerable to maintain. No. 2 is a concrete dock, 530 ft. long. At this site a wood hard pine dry dock was built about 1869. About 1887 it was said to be much decayed and it was ordered out and to be replaced with concrete. Although the concrete dock was completed about eleven years ago it has not yet done any work and work is still being done on it. No. 3 is built of hard pine, 600 ft. long. It was built about 1869 and is still in good order. From the present condition of No. 3 dock it would seem evident that the wood dock was not replaced by the concrete dock No. 2 owing to decay of the wood dock.

"The Cramps have one dry dock at Philadelphia. It was built in 1875 of hard pine and is still in good order. It is 450 ft. long; depth of water over sill, 22 ft. Mr. Cramp said the repairs had been nominal and if building another dry dock they would build it of wood. He said he had large experience in planning, constructing and using dry docks and considers those of wood best commercial value. About 7,000 men are employed at these works.

"William Skinner & Sons Co. have one dry dock at Baltimore. It is built of hard pine with a concrete and granite entrance; is 628 ft. long over all; 600 ft. long on keel blocks; entrance 60 ft. wide at bottom and 80 ft. wide at top; dock 62 ft. wide on floor and 125 ft. wide at coping; depth of water over sills at low water 22½ ft., and over keel blocks 19½ ft. Commenced work June, 1899, and completed November, 1901. They intended to build a concrete dock and had plans prepared and tenders submitted, but before building visited other docks and obtained fullest information and decided to build of wood with concrete and granite entrance, and say if building today would build of the same dimensions and of the same material. Two years ago it would dock any ship afloat with the exception of twelve ships; today the exceptions would be about forty. No sea worms there. They consider wood entrance all right if no worms, but prefer concrete and granite entrance because this portion is thus permanent and the water shut out so repairs or extensions can be made to the wood dock within. Can pump out this dock in 1 1-3 hours. Cost of this dock about $600,000, including $75,000 for pumping station.

"The Newport News Ship Building & Dry Dock Co. has two dry docks at Newport News, Va. No. 1 was built of hard pine in 1888; it is 630 ft. long; depth from sill to coping, 36 ft.; keel blocks, 6 ft. high; draft on sill, 25 ft. Entrance is badly eaten by sea worms. No. 2 was built in 1900. This dock is hard pine, but owing to the sea worms the entrance is of concrete and granite. It is 800 ft. long; depth from sill to coping, 36 ft. At these works are employed from 7,000 to 8,000 men. The superintendent, Mr. Post, favors docks built of wood and says by far they are best commercial value. Can pump out No. 2 dock in 40 minutes. Extreme rise and fall of tide, 3 ft.; average, 2½ ft."

Recommendations of the committee are as follows:

"1. We recommend the dock be built of wood.

"2. We recommend the entrance be built of concrete and granite.

"3. We recommend the pumping plant of sufficient capacity to pump out the dock in 80 minutes.

"4. We recommend the dimensions be: Length on keel blocks, 665 ft., which includes 15 ft. recess at head of dock for bow of ship; width of entrance at bottom, 75 ft.; width of entrance at top, 90 ft.; width of dock on floor, 75 ft.; width of dock at top of keel blocks, 83 ft.; width of dock at coping, 140 ft.; depth of water over floor at extreme low water, 10 ft.; depth of water over keel blocks at extreme low water, 6 ft.; depth of water over keel blocks at extreme high water, 35 ft.; dock to be so located that it can be extended 100 ft.

"We have not the details necessary to prepare an estimate, but from a general knowledge obtained we believe such a dock can be built at this city for the sum of $800,000.

"1. Wood—We recommend the dock be built of wood, because we believe wood docks to be the best commercial value. The necessary repairs during a period of at least twenty-six years are merely nominal, and we saw docks thirty-six years old, in good order, in which practically no timbers had been renewed except the flooring; and docks built of wood have a farther commercial value over those of concrete or granite in a country of heavy frost. Work can be done at less cost in a dock built of wood, because it can be built much wider at top, thus admitting more light and air; there are more steps in the altars, thus giving better facilities for shoring and the workmen can get in and out at any point. The piles, sills and caps may be of our native woods, but the exposed wood should be hard pine or British Columbia fir.

"2. Entrance—We recommend concrete and granite entrance, because with a permanent entrance repairs or renewals can be made to the dock without stopping work in the dock, and the dock being necessarily unusually deep such entrance will give all the more stability. The construction of the dock of wood and the entrance of concrete and granite gives best commercial value and is true economy.

"3. Pumping—We recommend a first-class and ample pumping plant, because the falling tide would not drain the dock by from 10 to 18 ft., and we understand from parties using docks that if they had our tides they would not use them to drain docks, as the time is too valuable.

"4. Dimensions—We recommend dimensions with a view to the future; they are larger than most of the docks of the present day, but are smaller than some and are certainly not in excess of the requirements of shipping in this port in the early future. Owing to the rise and fall of tides in this port the docks should be unusually deep, and the depth we recommend as such that vessels drawing 15 ft. of water can be placed in or out of the dock during eighteen hours of each twenty-four.

"In regard to the desirablity, and we may say necessity, of a dry dock at the port of St. John, we beg to submit the following:

"It is the opinion of your committee that the time has arrived when a dry dock is absolutely necessary in the best interests of the port. We do not know of any other ocean port in the world with anything like the amount of shipping that is without a dry dock. In the year ending June 30, 1901, 330 ocean-going steamers of 335,790 tons cleared outwards at this port; 1,135 sea-going (sailing) vessels, of 142,822 tons, cleared outwards at this port; 630 coast steamers, of 394,206 tons, cleared outwards at this port; 2,160 coast sailing vessels, of 168,572 tons cleared outwards at this port; in all 4,255 vessels, of 1,041,391 tons, cleared outwards at this port. We have every ground for believing that this enormous tonnage will be largely exceeded in the early future. All other things being equal, especially with steam tonnage, the port with a dry dock would be given the preference by vessels seeking cargo. No stronger evidence could be given of the value and advantages of dry docks to a port than that your committee saw at Newport News. A scattered village on what may be called a barren marsh, has been built up to a large and prosperous city with a great ship building plant and 8,000 men employed. The commencement of the wonderful development, about thirteen years ago, was the building of a dry dock. We think it is a reasonable hope that a first-class dock at our port, with a modern repairing plant, would be the stepping stone to steel ship building in our port. Transportation is one of the most important questions to be dealt with by the government and people of Canada, and our port should be thoroughly equipped in every way, not only to enable it to hold its own in the great struggle, but also to enable it to forge ahead and take one of the first positions as one of the greatest shipping ports on the North Atlantic. It cannot be considered fully equipped without a dry dock, and that is why we have expressed the strong opinion that the time has arrived to equip the port in that respect."

HONORED BY CHICAGO NEWSPAPER WORKERS.

Vessel interests of the great lakes probably derive in daily business affairs more direct service from the newspapers than any other branch of industry in this country. The system of telegraphic reports of vessel movements, freights, accidents, etc., is highly essential to the conduct of lake commerce. So it happens that a few men trained in marine work on the newspapers of some of the leading cities of the lakes are generally known to vessel men—not in their own cities alone but throughout the lake region. Prominent among these is Homer J. Carr of the Lake Marine News Association, whose likeness appears herewith on account of an honor just bestowed upon him by the newspaper workers of Chicago. A few days ago Mr. Carr was unanimously elected president of the Chicago Press Club. The press club has 450 members, is in a most prosperous condition and is the most influential press organization in the country outside of New York city. It has handsome quarters on Madison street in the heart of the city. The Lake Marine News supplies telegraphic reports to thirty daily newspapers around the lakes and does a large business in direct reports to underwriters, vessel owners and shippers, with vessel reporting stations at Mackinaw City, Sault Ste. Marie and Detour. The Lake Marine News is in its eleventh year. Mr. Carr was its organizer and has been its manager since it was organized.

TO PROVISION STEEL CORPORATION SHIPS.

Officials of the United States Steel Corporation, or rather the Pittsburgh Steamship Co., are making arrangements for provisioning all their lake vessels—there are some 112 of them—at Sault Ste. Marie, Mich. They have purchased the steamer Superior, which ran for two or three seasons in the excursion trade between Cleveland and Euclid Beach park, and intend to convert her into a supply steamer. Capt. W. W. Smith and Chief Steward Chambers inspected the steamer at Port Huron a few days ago to see what changes it would be necessary to make in her. It is the purpose to convert the steamer into a provision store of the most comprehensive character with refrigerators for the preservation of meats and other perishable articles. She will run alongside of the vessels of the Steel Corporation as they pass the Sault and will supply them with all needed provisions. It is expected that the departure will save both time and money. Alterations will be made in the steamer at once so that she will be ready to go on her station at the opening of navigation.

MR. LEWIS NIXON ON THE SHIPPING BILL.

It was represented in the New York newspapers that Mr. Lewis Nixon who established the Crescent Ship Yard at Elizabethport, N. J., and who was recently elected to succeed Richard Crocker as the head of Tammany in New York, would endeavor to have the democratic congressmen from New York city support the shipping bill. Upon this point he said in New York recently:

"I have not sent for the congressmen, nor do I intend to do so. My attitude is well known. Something must be done for the merchant marine, and what is done should meet the views of all Americans interested in their country's welfare. If the present bill cannot be put into such shape that democrats can vote for it consistently, they must vote against it. No man will be instructed by me to vote against his judgment or conscience. Two-thirds of the over-sea commerce of this country is handled at this port, and whatever benefits that commerce will benefit this port in a greater measure than any other portion of the country. I think that both parties should join hands and give us a merchant marine as they did a navy.

"So far as my business goes, I do not make ships large enough to be benefited by the proposed measure. My party will never find me advocating measures that does not meet with its approval. My views on the merchant marine are founded on patriotic regard for the country and this city, and I am proud of them. But so long as they are my own and not my party's I shall make no effort to force them upon any one. The republican party does not want democrats to assist in measures tending to improve the conditions of our commerce, although for forty years they have been untrue to their trust and have allowed our merchant marine to decline until that engaged in over-sea traffic carries only 8 per cent. of the trade.

"Jefferson urged congress to find out and to apply all proper means permitted by the constitution to nourish over-sea commerce. Those who oppose the upbuilding of the merchant marine by misrepresenting me are simply hurting the city and are not hurting me, as I propose to be not a peddler of patronage, but one who will at all times do what is in my judgment best for the interests of the city and its commercial and manufacturing interests. I shall, however, always remember that I am a democrat and keep to the party principles. In conclusion I have not seen nor written to any member of the New York delegation on this subject."

SHIP YARD NOTES.

Works of the Baltimore Dry Dock & Ship Building Co., Locust Point, Md., are very fully employed. The keel for two steel barges, capable of holding 1,000 tons of coal each, are about to be laid. The barges are for the New York Automatic Scale & Barge Co. and will be equipped with a patent unloading device which has already been described in the Review. Each barge will be 140 ft. in length, 30 ft. beam and 18 ft. deep. The company has put in a bid for the construction of a barge for the Standard Oil Co. and also for a tug for Flint, Eddy & Co. of New York.

The Tacoma Ship Building Co., Tacoma, Wash., has the following contracts under way: The four-masted wooden barkentine Thomas P. Emrigh for the Charles Nelson Co., San Francisco; four-masted barkentine Arline for J. J. McKinnon of San Francisco; the steam schooner South Bay for E. J. Dodge of San Francisco; a passenger steamer, 110 ft. long, for A. W. Horn, San Francisco, and a fish steamer, 85 ft. long, for the Union Packing Co., Tacoma, Wash.

W. A. Boole & Son of San Francisco will build the first six-masted wooden schooners ever constructed on the Pacific coast. Contracts for two of them have just been given to the firm by San Francisco parties. The vessels will be of the following dimensions: Length, 315 ft.; beam, 45 ft.; depth, 16.8 ft. The keels will be laid shortly.

Messrs. Sinn & Page, naval architects and marine engineers, of Sparrow's Point, Md., have secured an order to build a steamer of the following dimensions for the Woodsum Steamboat Co.: Length between perpendiculars, 50 ft.; length over all, 55 ft.; beam, molded, 12 ft. The steamer will be used on Lake Sunapec.

The Portland Ship Building Co., Portland, Me., has elected the following officers: John H. Humphrey, president; Edmund R. Norton, treasurer; Ralph S. Norton, clerk; Nathan R. Dyer, superintendent.

Davis Bros., Gloucester, Mass., have contracted with Tarr & James, Essex, Mass., for an auxiliary gasoline engine fishing schooner of the following dimensions: Length, 118 ft.; beam, 25 ft.; depth, 10 ft. 6 in.

GOLD WATCH FROM THE GOVERNMENT.

A Montreal dispatch says: Sir Thomas Shaughnessy, president of the Central Pacific Railway, has presented to Capt. George McDougall, of the company's lake steamer Athabasca, a valuable gold watch and chain, the time piece bearing the inscription, "From the president of the United States to Capt. George McDougall for humane services performed in the rescue of the captain and crew of the United States barge Preston, on Lake Superior, June 29, 1901."

It will be recalled that on that date the Athabasca sighted the Preston, which was lumber laden, flying a flag of distress and in a sinking condition. Coming to the barge's assistance the captain of the Athabasca, seeing no chance of saving the barge or its cargo, put all his efforts to save the crew, which he succeeded in doing with one exception, the wheelman, who lost his life line, and was crushed between the two boats. The crew of the Athabasca contributed $100 towards the relief of the unfortunate sailor's widow. This present was sent by President Roosevelt to the office of foreign affairs in London, and turned over by Lord Lansdowne to the secretary of state for the colonies, Joseph Chamberlain, and by him sent to Lord Minto, governor general of Canada, who forwarded it to President Shaughnessy for final delivery.

The W. D. Forbes Co., machinists, of No. 1300 Hudson street, Hoboken, N. J., was incorporated last week with a capital stock of $100,000. Col. Edwin A. Stevens, the Castle Point millionaire, who long has been interested in the company, has developed nearly all of his mechanical inventions in the Forbes shops. The colonel gets his chief exercise by working at a bench in the shops with skilled mechanics.

FAVOR ACCEPTING THE PANAMA OFFER.

The president has sent to the senate the isthmian canal commission's report on the offer of the Panama Canal Co. to sell its rights and property to the United States for $40,000,000. The commission reports unanimously in favor of accepting the offer, which it finds was made in good faith and includes all the property held by the company. This offer remains in force until March 4, 1903, and the directors have been given full power to act. The cablegram from President Bo of the canal company to Admiral Walker says everything will be conveyed, if the offer is accepted. This includes 30,000 acres which cover nearly all the land needed for the canal and 2,431 buildings, including two permanent ones in Panama, a lot of machinery, launches, dredges, locomotives, cranes, surveying instruments and other supplies. The report says of the work done:

The excavation already accomplished upon the main canal line, which will be of value in the plan favored by the commission, was carefully computed, and was found to be 36,689,965 cubic yards. As stated in the report of Nov. 16, 1901, the amount of excavation which can be utilized in the Chagres diversion is 210,873 cubic yards, and in the Gatun diversion 2,685,494 cubic yards. Adding these together, the total quantity of excavation which will be of value in the new plan is 39,586,332 cubic yards. A temporary diversion of the Panama railroad has been made at the Culebra cut, which also must be considered. The value of the work done is found to be:

Canal excavation	$21,020,386
Chagres diversion	178,186
Gatun diversion	1,396,456
Railroad diversion (four miles)	300,000
Total	$22,895,028
Contingencies, 20 per cent.	4,579,005
Aggregate	$27,474,033

The railroad company owes $986,918 to the Panama Canal Co., mainly on account of the construction of the pier at La Boca. Its total liabilities are $2,490,918, not counting the sinking fund subsidy bonds, for which the Colombian government has received the benefit and it should make allowance to the United States in the negotiations for treaty rights. Its cash assets Jan. 15, 1902, were $438,569.33. It owns three passenger and freight steamers of American registry, which constitute the Panama Railroad Steamship Co. Besides its rights of way, terminals, wharves and considerable areas of land, it owns nearly the whole town of Colon, the houses there being constructed under leases. The railroad company has no operating contracts which cannot be terminated in ninety days. The work of constructing the canal will largely increase the business of the railroad, and will enable it to pay off its liabilities in a very few years. After the completion of the canal its commercial profits will probably cease, but it will have a value incidental to operating the canal. The value of the maps, drawings and records, all of which are to be transferred to the United States, is placed at $2,000,000. Summing up the foregoing items the total value of the property is found to be:

Excavation done	$27,474,033
Panama railroad stock at par	6,886,300
Maps, drawings and records	2,000,000
	$36,360,333
To which add 10 per cent. to cover commissions	3,639,667
Total	$40,000,000

The last item is intended to cover buildings, machinery, railroad shares and other matters.

The commission concluded the Panama route would cost $45,480,000 less and would be 134 miles shorter than the Nicaragua. A vessel could pass through the Panama canal in twelve hours; by the other route in thirty-three hours. The Nicaragua would save time for vessels going north. Cost of Nicaragua canal, $189,864,062; Panama, $184,233,358. It would take ten years to build the shorter canal and eight for the Nicaragua. It would be necessary to secure a new grant from Colombia to get control of the canal forever. Under the French agreement the property reverts to Colombia in 1910. It would cost $1,300,000 more to maintain the Nicaragua canal.

The senate has not arranged for consideration of the canal question. Senator Morgan says the United States cannot buy the Panama line and be freed from its debts unless the French government guarantees that this country shall not be responsible for past liabilities. Secretary Hay will begin negotiations with Senor Silva, the Colombian minister to the United States, for the conclusion of a protocol setting forth the arrangements on which Colombia will concede to the United States the necessary rights and privileges this government will require to undertake the completion of the Panama canal.

CONSOLIDATION OF OCEAN STEAMSHIP LINES.

During the past few days the newspapers have been full of a reported consolidation of the Red Star, Leyland, Atlantic Transport, Cunard and White Star lines and that Mr. Morgan has in hand a combination of ocean carriage that will rival in magnitude his famous Steel Corporation. There is undoubtedly something in the reports but not as much as the newspapers seem to think. It is extremely unlikely that the White Star and Cunard lines are to be included—at any rate as far as their passenger business is concerned. It is more than likely that the Leyland line, Atlantic Transport and part of the business of the International Navigation Co. will be consolidated. Interests in these lines are very closely associated and it would not be a difficult matter to merge them into one company; though it is understood that whatever the form of merger may be the companies will maintain their independent existences as the underlying companies of the Steel Corporation now do. However, a party of gentlemen will reach this country on Thursday on the Celtic to discuss the subject and we shall doubtless know more about it when the week is over.

THE MARINE ENGINEERS.

The national convention of the Marine Engineers' Beneficial Association in Washington this week undoubtedly gave considerable attention to the question of wages, extent of engine-room help, etc., on the great lakes during the coming season, with special reference to the action of officials of the United States Steel Corporation in first making contracts with their men at the highest wages thus far paid in the service and then ordering the men to work on Monday last. Engineers who signed contracts relating to employment on the Steel Corporation vessels were receiving their pay regularly, as they were employed by the year, but in the usual course would not be called to active duty until late in March or early in April. The order to begin work is, of course, looked upon as a test proceeding. The engineers promptly obeyed the order and went to the various ports where their vessels are laid up. As far as known they all went willingly. What position the national organization will take towards the Steel Corporation engineers and what its demands will be upon lake vessel owners generally for the coming season are matters not as yet given out. It is understood that the national body is opposed, for this year at least, to affiliation with the longshoremen's association. One act of the convention having special reference to the lakes is the reported election of E. I. Jenkins of Cleveland to vice-presidency with special charge of lake lodges. Mr. Jenkins is a very capable engineer and has been in the steamer Presque Isle for some time past. He was very active on the side of the engineers in the struggle of a year ago. It is said that the lakes will be divided into five districts and a business agent selected for each district to work under the direction of Vice-president Jenkins.

Officers of the national body for the ensuing year, elected at the Washington meeting, are as follows: President, George Uhler of Philadelphia; first vice-president, Frank A. Jones of Alameda, Cal.; second vice-president, E. I. Jenkins of Cleveland, O.; secretary, George A. Grubb of Chicago; treasurer, A. L. Jones of Detroit. The advisory board of 1902 will include William Sheffer of Baltimore, Joseph Brooks of Philadelphia and John Sterrett of New York. It was decided to meet in Washington again in January, 1903.

Engineers selected for the Pittsburgh Steamship Co. (Steel Corporation) fleet are as follows:

Steamer.	Chief Engineer.	Second Engineer.
Bartlett	Aubrey Rivard	George Moiles
Bessemer	John B. Heyward	William Clucas
Black	John Hegemer	Jay A. Popp
Briton	A. G. Haig	H. M. Lubahn
Bunsen	Richard Masten	C. L. Birtrand
Cambria	E. H. Learned	J. A. Bennett
Colby	F. E. Sanders	W. H. Roach
Colgate	Warren Welch	A. Armstrong
Coralia	Alex McKenzie	A. W. Carlisle
Cornell	A. L. Eggert	John H. Riggin
Corona	Warren G. Tilton	Daniel Milloy
Corsica	J. J. Norcross	Morris Carroll
Cort	Joseph Taylor	Harry Firby
Crescent City	Irwin Marshall	A. E. Buddemeyer
Eads	A. J. Smith	John Beaubien
Edenborn	E. S. Stoddard	Peter A. Rivers
Ellwood	George C. Lawrence	John B. McDermid
Empire City	Frank Mansfield	G. Barnhardt
Ericsson	Ansel P. Williams	M. J. Huber
Fairbairn	David A. Black	Neil McNeil
Fulton	James L. Walker	Ross Leedham
Gates	Julius W. Greiner	George A. Gardner
German	Fred Warning	Roy B. Huston
Gilbert	A. McGillivray	George Trivillion
Grecian	John Dupont	Joe Hasler
Griffin	Bernard Woods	Joseph W. Popp
Harvard	C. H. Burke	J. F. Wood
Hill	W. L. Campbell	Harry Roberts
Houghton	J. W. McEachren	F. L. Smith
Hoyt	J. B. Miller	J. L. Wartinbee
Joliet	George Lynn	Joseph Walker
Lafayette	Levi Walder	S. D. Graham
La Salle	Joseph R. Hall	
Linn	Herman Dupont	Albert J. Armson
Manola	William Densmore	James McNamara
Mariska	Silas H. Hunter	Charles A. Tyler
Maruba	George Arnold	Alva W. Smith
Matoa	E. J. Rae	Frank McDonald
Marina	Gavin A. Brown	A. H. Meldrum
Masaba	L. F. DeMay	John Cowley
Maritana	John McLaughlin	Thomas McKenzie
Mariposa	W. W. Tyler	John Hutty
Maricopa	F. A. Smith	Daniel D. Hayward
Mataafa	John Reed	Charles Wiltoncox
Mauna Loa	Frank Harringer	John Hall
Malietoa	T. Treleaven	William J. Baird
Mather	George McLaughlin	John Hoff
McDougall	James Wilson	William J. Davidson
Morse	E. W. Fox	H. McLeod
Neilson	A. P. Williams	Walter T. Smith
Poe	William Most	J. A. McPhee
Palmer	August Dumars	
Princeton	M. Toner	Bernard Cassady
Queen City	F. G. Carey	Ray T. Snyder
Rensselaer	John F. Walsh	A. J. Dwyer
Rockefeller	Thomas Kelly	Frank Sweeney
Roman	S. A. Wells	William Dornbrook
Saxon	F. A. Steadley	E. H. Pelton
Siemens	Duncan McVicar	Charles B. Culver
Stephenson	S. W. Armstrong	William Morrow
Superior City	Frank Schwartz	James D. Stewart
Thomson	J. H. McGlenn	Eugene Gunther
Trevor	Walter J. Harsant	John Mraz
Van Hise	W. J. Gervin	Harry Flood
Watt	Arthur W. Armson	H. E. Schmidt
Wawatam	William P. Tindall	W. B. Clarke
Willson	C. A. Fletcher	John A. Larmer
Wolvin	E. E. Stimson	W. D. Killett
Zenith City	R. W. Hunter	Andrew Jackson

NAMES FOR NEW LAKE FREIGHTERS.

Names have already been selected for most of the new freighters that are to enter lake trade in the spring. Mr. Henry A. Hawgood has decided to give the name Etruria to the steamer which the American Ship Building Co. is building for him at Bay City. The other steamer under construction at Bay City to be managed by W. A. Hawgood, will be named Bransford. Arthur Hawgood's vessel, building at Lorain, is to be christened J. M. Jenks, and one of T. A. Tomlinson's steamers, building at Superior, will bear the name Sultana. The Gilchrist steamer still on the stocks at Lorain, will be christened E. N. Saunders.

One of the 6,000-ton Mitchell steamers building at the Cleveland works of the American Ship Building Co. will be launched Saturday, Feb. 1, and named W. H. Gratwick, in memory of the late W. H. Gratwick, lumber dealer and vessel owner, of Buffalo, who was very largely interested in all of Capt. Mitchell's early business undertakings. A steel steamer, W. H. Gratwick, is already in service on the lakes, but some plan of distinction will probably be devised. A 5,000-ton freighter for W. C. Richardson and others of Cleveland will be put down on the stocks vacated by the Gratwick. This vessel will be named W. C. Richardson. Her machinery is well advanced and the hull will go up very rapidly after a start has been made.

Redondo is the name selected for the steamer building at the works of the Craig company, Toledo, for Swayne & Hoyt of San Francisco. A smaller steamer at the same yard, building for Cleveland paries and for Charles Beatty of Buffalo, will be named Charles Beatty. It has been said that the large freighter which the Craig company is building for Thomas Adams and others of Detroit will be named William McKinley, but this announcement is not made by either builders or owners.

Names have been selected for all five of the steamers building at Chicago, Bay City and Buffalo works of the American company for the United States Transportation Co., of which Capt. W. W. Brown of Cleveland is manager. The names are A. G. Brower, H. S. Wilkinson, W. W. Brown, William Nottingham and L. C. Smith. These are names of stockholders in the United States company.

A steamer of the 5,000-ton kind, just launched at the West Superior works of the American company for Frank Seither of Cleveland, Capt. England of Detroit and others, has been named G. J. Grammer. Mr. Grammer is general traffic manager of the Lake Shore Ry. Co.

AROUND THE GREAT LAKES.

Capt. Thomas Brown, eighty-five years old, for many years identified with lake traffic as owner and captain of vessels, died at his home in Chicago Tuesday.

Com'dr Wilson, lighthouse inspector in the Lake Superior district, has recommended the establishment of gas beacons on the ends of the breakwater at the entrance to Portage Lake ship-canal and also on the breakwater at Two Harbors.

Officers of the Wilson Transit Co. of Cleveland, elected at the annual meeting on Tuesday last, are: President and treasurer, J. E. Upson; vice-president, Robert McLaughlin; secretary, H. D. Goulder; assistant secretary and assistant treasurer, A. W. Thompson. The directors are Robert McLaughlin, W. D. Rees, J. E. Upson, Geo. L. Quayle and J. J. Sullivan.

Detroit lodge, No. 7, of the Shipmasters' Association, has appointed a committee consisting of Capts. A. J. McKay, Enos Burke and Hugh McKenzie, to co-operate with George P. McKay of Cleveland, chairman of the committee on aids to navigation of the Lake Carriers' Association, in securing additions where needed, and a more satisfactory adjustment of present lights.

Detroit lodge, No. 87, of the Marine Engineers' Beneficial Association recently elected the following officers: President, Wm. J. Macdonald; vice-president, Thomas Braundt; corresponding and financial secretary, Geo. B. Milne; treasurer, Wm. McKittrick; chaplain, Richard Langford; conductor, Arthur Carter; doorkeeper, Geo. Gilbert; trustees, John Taylor and Charles Scott.

Officers of Marine Engineers' Beneficial Association, No. 5, of Cheboygan, Mich., elected recently, are: President, Alfred Vincent; vice-president, John Lowery; recording secretary, Jas. W. Brown; corresponding secretary, Archie Stalker; financial secretary, John McLaughlin; treasurer, Patrick Eustace; chaplain, Charles Chapman; conductor, Durham Elliott; doorkeeper, John Lighthall.

Duluth harbor, No. 4, of the American Association of Masters and Pilots recently elected the following officers: Capt. H. J. Hawkes; first pilot, Joseph Jacobs; second pilot, Lawrence Roy; captain's clerk and purser, C. D. Hibbard; purser's clerk, Wm. Jones; starboard quartermasters, Fred Winter and Daniel Neville; port quartermasters, L. M. Stapnos and A. M. Jones; chaplain, A. C. Majo; saloon watch, Arthur S. Osborn; forward deck watch, Wm. A. Cooley; trustees, John Grady, A. C. Majo and W. H. Hawkes.

Capt. Frank D. Root will have charge of the Great Lakes Towing Co.'s business at the Sault during the coming season. Capt. Root was master of the steamer Mataafa of the Steel Corporation fleet last season and for a number of years sailed steamers of the Minnesota fleet. Capt. E. T. Rattray, master of the steamer Rensselaer, also of the Steel Corporation, has resigned and he will sail one of the new steamers that are building for the W. W. Brown syndicate. Capt. G. W. Pierce, another of the masters in the big fleet last season, will be in a new boat during the coming season.

At a meeting of the executive committee of the Great Lakes Towing Co. in Cleveland Wednesday the regular quarterly dividend of 1¾ per cent. on the preferred stock was declared, payable Feb. 20. No action was taken regarding a large steel lighter with derrick equipment, which the company proposes to order, but the lighter will probably be built at the Milwaukee works of the American Ship Building Co. and completed in time for wrecking work next season. The matter of making additions by purchase to the wrecking plant of the company was referred to President Newman and General Manager Sinclair. The annual meeting of stockholders of this company will be held in Jersey City, N. J., Feb. 19.

The United States circuit court of appeals (New York) does not support Judge Coxe of the district court in the Livingstone-Grand Traverse collision case. On Oct. 19, 1896, the steamer Livingstone, owned by Wm. Livingstone and others of Detroit, collided with and sank in open lake near Colchester, Lake Erie, the steamer Grand Traverse, owned by the Lackawanna Transportation Co. of Buffalo. The case was heard before Judge Coxe at Utica, N. Y., and on May 30, 1898, he entered a decree holding both vessels at fault and dividing the damages. The case was taken to the circuit court of appeals and that court finds the Livingstone solely at fault. The opinion is not yet at hand. It will probably prove quite interesting. Damages claimed by the Grand Traverse amount to about $58,000. The principal lawyers in the case were C. E. Kremer of Chicago and F. H. Canfield of Detroit for the Livingstone, and Goulder, Holding & Masten of Cleveland for the Grand Traverse.

A RECORD IN SCOTCH SHIP BUILDING.

BY BENJAMIN TAYLOR, GLASGOW.

The year 1901 has been a record one in ship building and shipping everywhere, but nowhere more so than in Scotland. Here our ship yards never were busier, beginning the century with orders on hand to the extent of upwards of half a million tons. In the early part of the year there was little new booking because the cost of material was still above the ideas of ship owners, and a general decline in coal and iron was expected. In the early summer, however, a great revival of demand set in, and for several months in succession our builders booked freely, and largely, so much so that material, which had cheapened, began to stiffen again. It was not, however, a rise in material, but a fall in freights which choked off the demand for new ships. During the last three months of the year ship builders have booked little, but, during that period, as over all the year, they have been busily engaged with the contracts they had on hand. There is no room for doubt that too many ships have been built during the last two or three years, not only in Scotland but everywhere, and that had not such a large amount of tonnage been taken up by government, in connection with the South African war, the glut would have been felt earlier and would have been more pronounced. My present purpose, however, is not to discuss the commercial aspects, but to present some data of the work actually done in, perhaps, the busiest year in the history of industry. It has been a year in which ship builders' profits cannot have been very large, for material, coal and wages have remained high. And it has been a bad year for ship owners, especially in the last half. Never has there been such an amount of tonnage produced in any one year, and it is doubtful if in any previous year there was such a low general range of freights.

As to the actual amount of ship building done, before I deal with Scotland specifically, I give the following summary in terms of the board of trade (not builders') measurement, of the entire output of the United Kingdom in 1901 and also in 1900:

	1901.			1900.		
	Vessels.	Tons.	I.H.P.	Vessels.	Tons.	I.H.P.
Scotland	376	554,406	472,190	406	534,759	490,646
England	834	1,091,347	895,328	816	994,519	679,380
Ireland	23	151,922	109,300	26	131,431	67,600
Total	1,233	1,797,675	1,476,818	1,248	1,660,709	1,237,626

The Scotch ship yards and engine shops thus provided practically one-third of the output of steam tonnage of the United Kingdom. The number of vessels turned out in Scotland as compared with England is evidence of the great variety of craft turned out by the Scotch yards. If builders' measurements were taken as the basis of comparison the Scotch total would be about 20,000 tons more than in the above table. The contributions of the several ship building districts of Scotland have been as under:

	1901.			1900.		
	Vessels.	Tons.	I.H.P.	Vessels.	Tons.	I.H.P.
Clyde	297	511,990	440,125	318	486,337	459,138
Forth	32	15,523	2,935	33	18,402	5,490
Tay	16	20,458	20,460	14	21,639	17,228
Dee	31	6,435	8,670	41	8,381	8,790
	376	554,406	472,190	406	534,759	490,646

The great ship building centers of the United Kingdom are the Clyde, the Tyne, the Wear, the Tees, the Thames, and Belfast. Now see how the Clyde compares with these:

Clyde output	511,990	tons.
Tyne output	313,137	"
Tees and Hartlepool output.....	312,970	"
Wear output	270,556	"
Thames output	55,400	"
Belfast, etc., output	151,922	"

The output of the royal dock yards was 64,910 tons, which looks big compared with only 5,230 tons in 1900; but the two years together are really under the average. Warship tonnage means displacement, not measurement. All the other ship yards in the world outside of the United Kingdom seem to have turned out in 1901 about 860,000 tons. So that the Clyde output is more than half the tonnage built abroad. It is very nearly equal to the whole output of the United States and Germany put together. And yet it does not include the yard with the largest individual output, that distinction belonging to Harland & Wolff of Belfast, whose record was 92,316 tons, whilst the largest individual Clyde record was that of Russell & Co., Port Glasgow, with 58,337 tons. The individual output of each ship building firm in the Clyde district, by board of trade measurement, along side the outputs of 1900 is given below:

	Sail.		Steam.		1901,	1900,
	Vessels.	Tons.	Vessels.	Tons.	Tons.	Tons.
Russell & Co.....	2	7,540	14	50,847	58,387	54,415
John Brown & Co.....	.	....	4	49,800	49,800	26,250
Chas. Connell & Co.....	.	....	7	36,876	36,876	32,316
W. Denny & Bros.....	1	60	19	35,206	35,266	30,603
The Fairfield Co.....	.	....	3	28,565	28,565	17,765
D. & W. Henderson	3	482	5	24,081	24,563	29,043
A. Stephen & Sons	.	....	4	21,906	21,906	34,555
A. Rodger & Co.....	.	....	7	19,974	19,974	19,615
Barclay, Curle & Co.....	.	....	4	19,072	19,072	17,650
W. Hamilton & Co.....	3	6,905	3	11,367	18,272	23,482
London & Glasgow Co...	.	....	4	17,552	17,552	4,700
W. Beardmore & Co.....	.	....	4	17,390	17,390	6,250
Napier & Miller	.	....	5	17,067	17,067	21,518
R. Duncan & Co.....	.	....	4	14,931	14,931	12,000
Scott & Co.....	.	....	9	13,974	13,974	29,970
A. McMillan & Son.....	.	....	5	13,738	13,738	15,010
Caird & Co.....	.	....	2	13,387	13,387	22,714
Grangem'th&Greenock Co.	.	....	7	12,696	12,696	4,910
A. & J. Inglis	1	60	5	12,144	12,204	7,451
W. Simons & Co.....	.	....	11	8,650	8,650	15,700
Mackie & Thomson.....	.	....	8	6,377	6,377	6,301
D. J. Dunlop & Co.....	.	....	3	5,433	5,433	8,320
Fleming & Ferguson	.	....	8	5,400	5,400	3,300
The Ailsa Co.....	4	128	5	4,876	5,004	5,340
Lobnitz & Co.....	.	....	14	4,606	4,606	8,100
The Clyde Co.....	.	....	6	4,265	4,265	1,700
Campbeltown Co.	.	....	2	3,156	3,156	4,473
Ritchie, Graham & Milne.	7	750	2	2,200	2,950	1,620
Alley & McLellan	24	2,441	1	50	2,491	1,105
John Reid & Co.....	.	....	1	2,217	2,217	4,296
Bow, McLachlan & Co....	.	....	7	2,208	2,208	2,602
Murdoch & Murray	.	....	2	2,117	2,117	3,351
The Irvine Co.....	.	....	3	1,840	1,840	1,620
J. Fullerton & Co.....	.	....	4	1,735	1,735	2,365
S. McKnight & Co.....	.	....	3	1,691	1,691	1,215
Scott & Sons.....	.	....	5	1,373	1,373	1,264
J. Shearer & Son.....	.	....	2	966	966	528
W. Chalmers & Co.....	2	300	12	476	776	410
The Ardrossan Co.....	.	....	3	761	761	920
D. M. Cumming.....	5	320	1	300	620	200
Cochran & Co.....	.	....	1	500	500	629
Geo. Brown & Co.....	.	....	2	350	350	....
W. Fife & Son.....	7	230	..	....	230	62
R. McAllister & Son.....	.	....	6	172	172	60
Burrell & Sons.....	.	....	1	120	120	....
J. & J. Hay.....	.	....	1	120	120	100
A. Munro	5	80	..	....	80	30
Paul Jones & Co.....	.	....	1	70	70	....
T. B. Seath & Co.....	.	....	1	50	50	455
James Adams	.	....	1	25	26	52
A. Robertson	1	16	..	....	16	....
	65	19,312	232	492,678	511,990	486,337

The 1901 total includes sixty-five sailers of 19,312 tons, of which Russell & Co. built two of 7,540 tons, W. Hamilton & Co. three of 6,905 tons, and Alley & McLellan twenty-four small craft aggregating 2,440 tons. The following statement shows the output of previous years:

	Tons.		Tons.
1900.....	486,337	1889.....	325,201
1899.....	491,074	1888.....	280,037
1898.....	466,832	1887.....	195,362
1897.....	340,037	1886.....	172,440
1896.....	420,341	1885.....	193,453
1895.....	360,152	1884.....	296,854
1894.....	340,885	1883.....	419,664
1893.....	280,160	1882.....	391,934
1892.....	336,414	1881.....	341,022
1891.....	325,477	1880.....	241,114
1890.....	362,168		

In twenty-two years the output has more than doubled. Compared with 1886 it has trebled.

A GREAT VARIETY OF WORK.

The work of the year has been very varied. That of Russell & Co., who head the list, has been, with the exception of two sailers, entirely of cargo boats ranging from 1,300 to 5,000 tons each, for British and foreign owners. That of Wm. Denny & Bros. has included the famous Shamrock II and the steam turbine passenger boat King Edward, as well as liners for the Indian, New Zealand & Australian service. The output of John Brown & Co., Clydebank, has included two first-class cruisers for the British government, and a torpedo boat destroyer, as well as the two American (international) liners, Haverford and Merion. That of Caird & Co. consisted solely of two big liners for the eastern trade of the Peninsular & Oriental Co. That of D. & W. Henderson & Co. included the cutter yacht Kariad, which has made a name for herself in the past season, and a couple of barges, as well as three new Anchor liners, and a couple of other large boats for Dutch and Scotch owners. The output of the Fairfield company consisted of two very large cruisers for the British navy, and a liner for Japan. That of Charles Connell & Co. included a Castle liner as well as a number of big cargo boats. That of Alex. Stephen & Sons included a 10,000-ton boat for the Danish-American service, as well as ordinary craft. That of Barclay, Curle & Co. consisted of one City liner and three Union-Castle liners. That of William Hamilton & Co. consisted of three sailers and three large cargo steamers. The output of the London & Glasgow Co., Glasgow, consisted of one first-class cruiser for the British navy and three liners for the China trade. That of William Beardmore & Co. consisted of one small despatch boat for the British government, two Union-Castle liners and a 10,000-ton cargo liner. That of Scott & Co. included no fewer than six boats of about 2,000 tons each for China. That of A. McMillan & Co. included two "Clan" liners, a couple of 1,000-ton boats for Mexico, and a large cargo tramp. The output of A. & J. Inglis consisted of two British India Steam Navigation Co. liners and some small craft for the colonies and home. That of Wm. Simons & Co. included five big dredgers for foreign countries, two for the British colony of Natal, and four hopper barges for home employment. That of Lobnitz & Co. consisted also of dredgers and dredging plant for home and foreign owners. It is unnecessary to go over the whole list, but these items are taken at random in order to show the great variety of the work done by Clyde ship builders.

The yards on the Forth (Leith, Grangemouth, etc.), turned out thirty-two vessels of 15,500 tons as compared with thirty-three vessels of 18,400 tons in 1900. These were for the most part small and moderately-sized cargo boats, steam yachts, tugs and steam fishing vessels. The yards on the Tay (Dundee) turned out sixteen vessels of 20,460 tons, as compared with fourteen vessels of 21,640 tons in 1900. The most noteworthy product of the year was the Antarctic exploration vessel Dis-

covery, but there was also a Leyland liner of 8,000 tons, a Hamburg & River Plate liner of 4,000 tons, and a cargo boat of 2,300 tons for Canada, besides other craft. The output of the yards on the Dee (Aberdeen) was thirty vessels of 6,435 tons as compared with thirty-two vessels of 6,905 tons in 1900. Practically the whole of this output was in the form of steam fishing vessels (trawlers) and all, with two or three exceptions, for local owners. There were also constructed at the yard of John Duthie & Sons, Montrose (to the south of the Dee), ten trawlers aggregating about 1,800 tons.

STATISTICS OF MARINE ENGINE CONSTRUCTION.

The total indicated horse power of marine engines constructed in the world in 1901 is estimated at 2,246,630, of which 1,476,818 I.H.P. was in the United Kingdom, and 769,813 I.H.P. in other countries. Of this the Clyde proportion was 433,605 I.H.P., being nearly one-fifth of the output of the world and nearly one-third of that of the United Kingdom. But no individual engineer on the Clyde turned out as much as Richardson, Westgarth & Co. of Hartlepool, whose record was 106,000 I.H.P. The following shows the output on the Clyde of marine engines:

	I.H.P.
Brown & Co., Clydebank	61,000
Fairfield Co., Govan	57,200
Denny & Co., Dumbarton	30,650
London & Glasgow S. & E. Co., Govan	28,300
Dunsmuir & Jackson	24,700
Rowan & Co	19,280
Beardmore & Co., Govan	18,800
Henderson & Co., Partick	18,450
Kincaid & Co., Greenock	18,250
Stephen & Sons, Linthouse	18,100
Rankin & Blackmore	16,300
Scott & Co., Greenock	15,010
Barclay Curle & Co., Whiteinch	11,900
Ross & Duncan	10,615
Clyde S. & E. Co., Port Glasgow	10,600
Caird & Co., Greenock	9,300
Simons & Co	9,205
Bow, McLachlan & Co	7,760
W. V. M. Lidgerwood	7,680
A. & J. Inglis	7,150
Lobnitz & Co., Renfrew	6,150
Fleming & Ferguson, Paisley	6,150
Dunlop & Co., Port Glasgow	4,100
McKie & Baxter, Govan	4,400
Hutson & Son	4,050
Campbell & Calderwood	2,365
A. Rodger & Co., Govan	2,000
Fisher & Co	800
Other firms	3,500
	433,605

This total compares with some previous years as under:

	I.H.P.		I.H.P.
1900	459,138	1894	295,620
1899	478,603	1893	256,545
1898	510,815	1892	322,564
1897	373,195	1891	308,886
1896	426,759	1890	363,807
1895	363,490		

In 1900 the largest engine output in the world was that of the North Eastern Engineering Co., Wallsend-on-Tyne, with 81,910 I.H.P., while John Brown & Co., Ltd., Clydebank, came second with 70,000 I.H.P. It should be noted that engines are often made on the Clyde for vessels whose hulls are constructed elsewhere.

The year 1902 opens with orders already booked by Scotch ship builders to the extent of 430,000 tons, which is pretty well distributed but not evenly, and so it will be that in the early months of the year many of the yards will begin to present an empty appearance, unless there is a new inflow of orders. In the meantime contracting is at a standstill, so large is the over-supply of ocean tonnage, and so depressed are the freight markets. Of course the established lines and mail carriers have to keep up the efficiency of their fleets, no matter how traffic and freights fall off, and they will have to build anew as they have to do every year. But they are holding off meanwhile in the expectation of buying cheaper later on. Among the work on hand is an Ocean company liner and two Pacific company mail liners at the Fairfield yard; four British India liners at Inglis's yard; three large liners at Henderson's yard; Furness-Withy and Australian liners at the Clydebank yard; two large sailers for the Anglo-American Oil Co. at Rodgers' yard; two Peninsular & Oriental steamers and two Pacific Mail liners at Caird's yard; a 12,000-ton oil tank steamer for the Anglo-American Oil Co., two big cargo tramps and a British India liner at Scott's yard. These are only a few typical instances among the many items. The admiralty contracts under the last naval program have yet to be placed and it is tolerably certain that a large portion of them will come to the Clyde. Then the Cunard company and some of the big lines will have to build this year. For "cargo tramps" the demand for the present is "off."

THE SUBJECT OF RUDDERS.

The all important subject of ship-steering was under consideration at a recent meeting of our Institution of Engineers & Shipbuilders. Much light was thrown upon it by Mr. J. F. King, who, in the course of a paper on rudders described the types of rudder commonly in use in normal merchant vessels. He said it might have been expected that the gradual evolution of the tramp steamer, and the accumulated experience of hundreds of vessels of varying types would have produced a generally similar and presumably best form of rudder for each type, but really the most striking feature is the extraordinary diversity of opinion shown in the forms of rudder fitted in vessels of practically the same type. In order to ascertain the effect of rudder forms on steering, some experiments were recently made in the famous experimental tank at Messrs. Denny's works at Dumbarton. The different rudder blades were slipped into a circular stock. It was found that there was no steering value in the stock itself. A rudder of ordinary full form was found to have exactly the same turning force as a rectangular rudder of the same depth and area. The rectangular shape, however, possessed the practical advantage of showing a reduction in the twisting moment and corresponding area of stock on account of the center of gravity of the rudder plane being nearer to the center of the stock. Experiments with triangular rudders, one set having the bases and the other the apices of the water-line, showed that the series with the broad part at the water-line gave about 20 per cent. greater steering efficiency, and those with the broad part at the bottom of the stock about 8 per cent. less efficiency per foot of area than the square rudder. Mr. King suggests that the superiority of the former is due probably to the increase in wave-making resistance from the rudder blade towards the surface of the water, and to the form of the vessel causing acceleration of the stream lines towards the load line. As these simple forms practically embrace the extremes to be found in the curvilinear shapes, experiments were also made with rectangular and triangular rudders of different breadths. It was found that the value of each type varied directly as the breadth of the rudder. As the model used was that of a vessel of comparatively full form, having a co-efficient of .76 at the load line, it might be concluded that generally the best form of rudder for a merchant vessel would be one very wide at the load line and narrow at the bottom, but, it is contended that apart from the fact that a rudder of this form would require a large stock and more powerful working gear on account of its great breadth, it is probable that the action of the propeller accelerates the movement of water past all parts of the blade, and such a rudder would be useless when the vessel was in ballast trim. These experiments and considerations suggest that a square rudder is the most satisfactory form to adopt, as representing a large surface at the load line at all conditions of trim, and requiring the smallest stock and working gear in proportion to efficient area. Mr. King does not find sufficient reason, beyond fondness for curves, for the common practice of extending the rudder blade high above the load line, as he thinks the extra area can have little or no steering value, while it exposes unnecessary surface to shocks from seas, and adds unnecessary weight. With regard to the proportion which the area of the rudder should bear to the size of vessel it is generally believed that a narrow rudder which could be rapidly set to a large angle without undue loss of speed, if it had enough area, steers as well as, and perhaps better than, a broad rudder. The minimum for modern sailing vessels and for coasting or other steamers which require to maneuver under their own steam at slow speeds in narrow waters is computed at about 1.4 sq. ft. per 100 sq. ft. of middle line plane.

STEAMER BRANDON FOR THE OLD DOMINION STEAMSHIP CO. OF NEW YORK.
Building by the Harlan & Hollingsworth Co., Wilmington, Del.

REMARKABLE RECORD FOR PUNCTUALITY.

The American line steamship Philadelphia was reported at Fire Island at 1 o'clock in the morning on Saturday last. This is the fifth arrival of this steamer since Oct. 19, and during these winter months the Philadelphia has made a remarkable record for punctuality. Her sailing times from Cherbourg have varied between 5 p. m. and 5:30 p. m. on a Saturday and her arrivals at Fire Island between 1 a. m. and 5:30 a. m. on Saturday. This is a remarkable showing considering the fact that these five sailings were made during the winter months and in view of the voyages of other steamers.

PROGRESS OF SHIP BUILDING IN JAPAN.

From Engineering, London.

The yearly returns of ship building show the progress Japan is making towards the supply of her own fleet—both war and mercantile. The return of production last year gave 792 tons as the total displacement of warships built at the three principal government dock yards, and 19,971 as the gross tonnage of steel vessels built for the mercantile marine. In the private yards the industry is being fostered by a subsidy of £2 per gross ton on all ships exceeding 1,000 tons, of a somewhat less sum for ships between 700 and 1,000 tons, and a further subsidy of 10s. per indicated horse power of propulsive machinery. Whether from patriotic motives or the stimulus of these subsidies, the private ship builders are, indeed, bestirring themselves and seeking to bring their works, their employes and themselves, into line with best modern practice.

Dealing first with the government dock yards, the three principal establishments are: One at Yokosuka, in the Bay of Tokio; one at Kure, in the Inland Sea; and one at Sasebo, on the west side of the island of Kyushu. They are all equipped for repairs rather than for new work, and in this respect form rather a contrast with the private yards. Whatever her ambition may be, there is at present no sign that Japan is preparing to build her own battleships or large cruisers. At each of the two establishments, Kure and Yokosuka, a third-class cruiser has been commenced, but nothing larger seems to be as yet in contemplation. All these three government establishments, on the other hand, have magnificent graving docks. At Yokosuka there are two, while a third is in course of construction which will be capable of accommodating any warship at present afloat or belonging to any nationa. At Kure there are also two. At Sasebo one large graving dock is just completed, and a larger is in progress. There are, besides, a special graving dock for small craft, an iron floating dock for torpedo boats, and a steel floating dock, under construction in England (at Messrs. Swan & Hunter's on the Tyne) for torpedo-boat destroyers. At Kure and Sasebo the docks at present working are just short of accommodating the largest Japanese warship.

Among the ship yard machines, newly installed in each of the government dock yards, is a set of plate rolls some 24 ft. in length; modern plate-edge planers stand beside them, having a length to suit. In one case there is a modern keelplate bender, but for the cruisers in hand at Yokosuka and Kure the keelplates are being set by hand. Hydraulic plant is used, but rather as an offshoot from the boiler shop than as an integral part of ship yard equipment. The woodworking machines for sawmill and carpenters' work are well up to date, but for the joinery department very few are used, hand skill—the legacy of the past—being still predominant. Naturally, where changes from the past to the present have been rapid, Japan presents some curious contrasts in the employment, close alongside, of the antique and the modern. At one place a log of hard wood is being ripped into planks by a somewhat diminutive (top) sawyer; at another the trench for the wall of a dry dock is kept clear of water by a series of ancient treadmills, each worked by one man, each receiving the water from its predecessor, and advancing it to a slightly higher level. At both Yokosuka and Kure there are Siemens furnaces capable of producing some 10 tons of steel in each case. This material is used exclusively for castings, and at present the sterns and stern-posts of the two third-class cruisers are being cast from it. In the engine shops, again, the machines are of a nature best adapted to a variety of repairs and replacements, and are not of the heaviest description. In the boiler shops, where replace cylindrical are seen side by side with water-tube boilers, vertical plate rolls, large and modern, are well in evidence, together with hydraulic and pneumatic plants. In none of these establishments is there any attempt at electric distribution of power; a light installation being all that is done with this medium.

There is no doubt that the Japanese gentlemen holding the highest positions at these government dock yards would be only too glad to be allowed to extend the plant and to be intrusted with larger work. They have all had European or American experience in the superintendence of Japanese warships built abroad, and are keen observers of advances made elsewhere. Under present conditions, however, it is to the private ship yards that one must look for the greatest advances in machines and methods, and the closest approach to modern practice. As with the government yards, so too with the private, repair work has in the first instance engaged most attention, the building of new ships being an adjunct encouraged and fostered (in some cases called into being) by the subsidies obtainable. At present there are some five principal private ship yards, respectively situated at Nagasaki, at Kobe, at Osaka, and two at Uraga. At the first-named place the works belong to the Mitsu Bishi Co., reputed the wealthiest private company in Japan and having at its head Baron Hisaya Iwasaki, a man of great enterprise and resource. They are spread over three separate districts in and near Nagasaki, one having a fine large graving dock and ship yard, the second a smaller graving dock and engine works, the third a repairing slip. The area of ground occupied in the first district is by far the largest, and amounts to fully eighty acres. On this ground the arrangement of building slips allows for four ships under construction at one time. On one side it is bounded by a steep hill, which, to some extent, hampers the best disposition of these slips. Among the modern machines with which this ship yard is supplied are the following: A set of 26-ft. rolls, several large plate-edge planers, a keelplate bender, a joggling machine, a large hydraulic punch, with columns widely spaced for flanging purposes. Hydraulic riveting is used for frames. A pneumatic installation is in hand for trial purposes, at least in the matter of riveting, caulking, cutting, etc., and some steps have been taken towards power distribution by electricity. For sawmill and carpenters' work the machines also are of the most modern description; but, as in the government yards, there are very few machines exclusively for joinery purposes, the work in this department being done now, as it has been in the past, wholly by hand. At the engine works are sheer legs to lift 100 tons, hydraulic riveters with some 8 ft. gap, and vertical rolls some 12 ft. in height. The largest steamer—the Iyo Maru—ever built at Nagasaki has just been launched. She has a length of 445 ft. between the perpendiculars, and a gross tonnage of 6,300. Her owners are the Nippon Yusen Kaisha, for which company also a still larger steamer is in preparation at the same works, the gross tonnage of this larger boat being some 10,000 tons.

At the Kobe works, the principal proprietor of which is Mr. Kawasaki, the ship yard and engine works are situated in close juxtaposition. There is a graving dock in course of construction. Unfortunately, the site lies in loose sand, and a good deal of trouble has been encountered in dealing with this mobile material. The difficulties have now been overcome, and the dock is in a fair way towards early completion. The modern tools at these works are of much the same class as those at Nagasaki, but in some instances they are not yet installed, though lying ready for the purpose; rearrangement of plant and building of new shops and sheds marking the present order of things. Last year their output was 6,616 tons, but this year it will run to a smaller total.

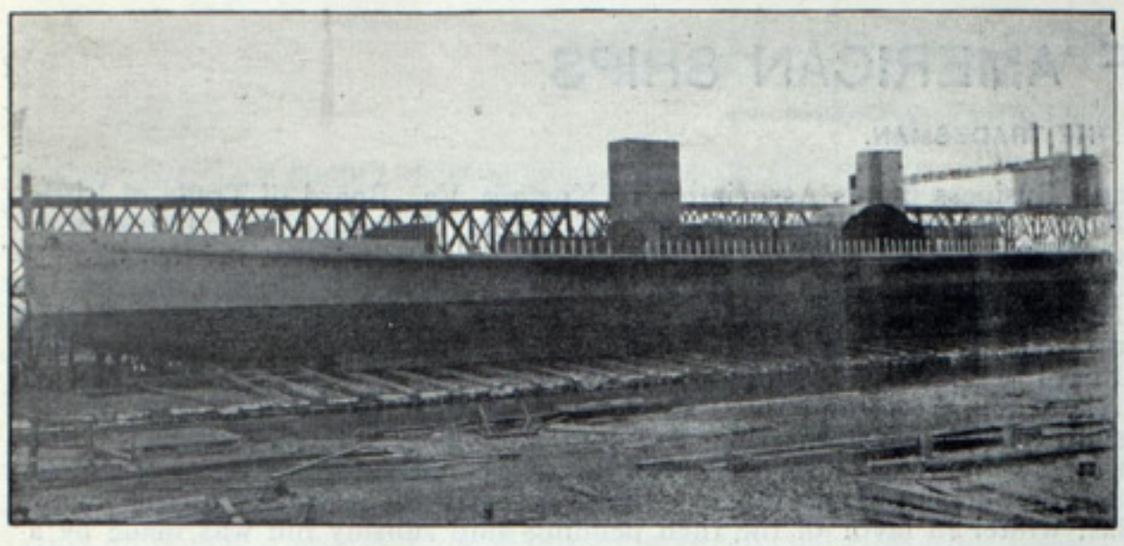
At Osaka the principal ship yard is connected with the so-called Osaka Iron Works. Until last year their operations were largely restricted to repairs. These were carried on in a confined space at some little distance up the reach of the river separating the town from the sea. Osaka, however, has a grand harbor scheme in hand, to cost fully £2,000,000, part of the money being supplied by government. When this scheme is carried out, breakwaters erected, and bars removed, the draught of water for steamers, instead of being limited, as now, to some 14 ft. at high tide, will be practically unlimited, and the harbor will be available for war and merchant ships of any size. At a convenient spot, in the neighborhood of the new harbor works, the Osaka Iron Works has started its ship yard. The site is well chosen, and there is plenty of room for future growth. The machines at present installed on this site are neither so large nor so varied as those comprising the plant at Nagasaki and at Kobe. There is, however, a small hydraulic installation, including a powerful pump used for flanging purposes. In course of preparation, also, is a modern pneumatic plant. The work both in hand and in prospect, also, is of a smaller description than that at the ship building centers previously mentioned. The most noticeable features of the yard is the situation—admirably chosen and at an opportune time—and the energy with which such work as at present suits the district has been carried out. The engine and boiler shops are still situated at the locality which, until last year, was the principal working center of the company.

At Uraga, near the entrance to the Bay of Tokio, are situated the other two principal ship yards. The one belongs to the Ishikawajima Co., the headquarters of which are at Tokio, and the other at the Uraga Dock Co. Each of these ship yards is at present furnished with one fine graving dock of large size, and the latter company has a second and larger dock in contemplation. For repair work they compete keenly one against the other, and against the Yokohama Dock Co. The latter company has its docks at Yokohama, the only port of the district for ocean-going steamers. Ships docked at Uraga have usually to be shifted from Yokohama for the purpose. Attempts have been made to bring about a combination of the two Uraga companies, but so far the attempts have not been successful. In both the yards new plant of most modern description has been installed and is in process of installation, the Uraga Dock Co. having in hand a complete reconstruction of shops and sheds. The area to be covered by the completed works, including the ship yard, the two docks, engine shop, and boiler shed, is fully seventeen acres. At the Ishikawajima yard pneumatic power is actually now employed in the ship yard for the purpose of rimering and caulking. It has been tried also for riveting, but this is stopped until the men shall have had more experience of the simpler operations. This yard rightly claims to be ahead of all others in Japan in application of pneumatic power to ship work. The engine and boiler shops of the company are at a distance from the ship yard, being situated at the headquarters at Tokio.

As compared with ship yards at home, the small number of building slips compared with the size of the establishments is very noticeable. At Nagasaki, with an area in the ship yard alone of eighty acres, the building slips number not more than four. At Uraga, with an area for ship yard, two docks, engine and boiler shops of seventeen acres, two building slips only are contemplated. The explanation of this is not quite easily supplied. It seems to leave something for the economical developments of the future. Wages are low compared with other countries, a sum equal 1s. 8d. per day being a good day's wage for a skilled mechanic. Low though the wages appear, they are said to be nearly double what they were before the late war. Piecework is not common. The average time worked is sixty hours a week. Sunday is usually a holiday. When work is urgent the Sunday holiday is forgone, and wages paid the same as for other days. In some districts Sunday work appears to be the general rule, but in them two days a month, determined by their local importance, are observed as holidays.

At Nagasaki, Baron Iwasaki has devised and adopted a method of supplying his works with suitable apprentices, which seems both far-sighted and public-spirited. At an initial cost of some £5,000, an annual expenditure of £500 or more, he has established a school for the education of boys, principally the sons of his workmen, between the ages of twelve years and seventeen. The intention is to enter some fifty a year, and give them a five years' course of instruction, a good general education being combined with such specialization as shall lead on ultimately to a successful apprenticeship. Boys at this school are educated gratuitously, and at the end of their schooling are under no bond to enter the works. The school has existed for only three years, so that the practical advantage of it has yet to be tested. At present one must be content to admire the conception, waiting a little yet for its test as a means to a very desirable end. At the same time, it is worthy of remark that an industry, somewhat newly entered upon, will have a fair chance of success, if the chief men engaged in it are looking not simply to an immediate return for their money, but still more to an ultimate advantage, derived from a systematic improvement in the education and intelligence of their workers. This would be the case with an industry started in any country of the world, and is not the less so with one initiated under the peculiar circumstances pertaining to commercial enterprise of the far east.

Negotiations are under way for the formation of another combination of pneumatic tool concerns, with the Standard Pneumatic Tool Co. of Chicago as a nucleus. The proposed name is the Standard Pneumatic Tool Co. and the capital talked of is $2,500,000. The companies for whose plants and business negotiations have been taken up are the following: The Standard Pneumatic Tool Co. of Chicago, with works at Aurora, Ill.; International Pneumatic Tool Co. of London, with plants at Chippenham and Wiltshire, Eng.; Philadelphia Pneumatic Tool Co.; Standard Railway Equipment Co. of St. Louis, and the Cleveland Pneumatic Tool Co. It is stated that Charles R. Flint of New York is a prime mover in the deal.



STEAMER WESTERN STATES ON THE STOCKS.

One of the two paddle steamers—Eastern States and Western States—building at the Detroit works of the American Ship Building Co. for passenger and freight service between Detroit and Buffalo. To be the largest and most powerful side-wheelers on the great lakes. Fully described in the Review of Jan. 16, 1902.

PROGRESS OF WIRELESS TELEGRAPHY.

William Marconi, the inventor of wireless telegraphy, was the guest of honor last week at the annual dinner of the American Institute of Electrical Engineers at the Waldorf-Astoria. Mr. Marconi gave an account of the progress of wireless telegraphy and said that already more than seventy ships carried permanent installations of his apparatus and that the system had been put to commercial use in Great Britain. He went on to explain some of the practical workings of his invention as follows:

"I think I am right in saying that there is a general belief that when a message is once intrusted to space by this system any one with a receiver may pick it up. This objection to the earlier form of operations has recently been largely overcome. It has been found possible so to attune one transmitter to one receiver as to make it practically impossible for any one not acquainted with the qualities of those particular instruments to read the message. This is not the case with the installation on ships, because when a ship wishes to communicate with another in emergency she wants to be able to call up any other ship within range. For this reason, the installations on all ships are uniform, but on land or between lands we now use attuned installations. It was found possible by attuned instruments to cross 200 miles of land and the power required for this was only such as is needed to run a small incandescent lamp. It was then determined to erect two comparatively powerful installations at Cornwall and at Cape Cod for the conduct of experiments across the Atlantic. Unfortunately a hurricane partly destroyed the installation at Cape Cod and necessitated a postponement for some months. Rather than let the interval go by, it was thought well by a temporary installation at St. John's to try to cross 2,000 miles of ocean rather than 3,000 miles; so the attempt at Newfoundland was made with kites and balloons. We should have done more there, except for finding out that the Anglo-American Cable Co. had a monopoly of all forms of telegraphy there, and seemed to claim, in a certain way, a monopoly of the air and the sea. In England the British government has a monopoly of the telegraph, but I am glad to say that the government rather encouraged my work than attempted to interfere with it. I think that a permanent station will be established in Nova Scotia and the one at Cape Cod be repaired.

"I do not wish to be too confident, but I think that it will be possible in a short time to transmit a message, or perhaps several messages at the same time, across the ocean in a commercially practicable manner. I think that it will be possible to bring about communication between people far apart at greatly reduced rates. Those at present are beyond the reach of people of ordinary means, but should my dream be realized the cost of cables may be very substantially reduced, and another link be forged in the ties that bind this country to Great Britain."

A SENSIBLE SPEECH.

The "bobbin boy" of Scotland has said a great many sensible things but the speech which he delivered in New York last week is about the most sensible of all. It was not a long speech but a thoughtful one. In it he said that he had acquired more than a competence almost without intention or desire, but he said soberly and earnestly that beyond a competence wealth brought nothing desirable with it. He also said that business had never been a care with him, because he had never, particularly in later life, done any work that was worth speaking about. He had permitted his young partners to do the work while he did the thinking and the laughing. This is in reality the distinguishing characteristic of the great leader—recognition of the fact that the work which one man can actually do is very little, while the work which the organization can do, if unhampered, is unlimited. He adds that it took him some time to learn this but he learned it. Therefore vast as the Carnegie enterprises have been they have worried Carnegie very little. However the speech is so brief that we reproduce it in full:

"It is one of the most cheering facts of our day that under present conditions the wages of labor tend to rise, and the price of the necessities of life tend to fall. There never was a nation so splendidly situated as ours is at this moment in regard to labor. Every sober, capable and willing man finds employment at wages which with thrift and a good wife to manage will enable him to go far toward laying up a competence for old age. And here let one who has almost without intention or desire had himself loaded with somewhat more than a competence tell you soberly that what one has beyond this brings little with it, and sometimes nothing desirable with it; what all of you should strive for is a competence, without which Junius has wisely said no man could be happy.

"It took me some time to learn, but I did learn, that the supremely great managers, such as you have these days, never do any work themselves worth speaking about; their point is to make others work while they think. I applied this lesson in after life, so that business with me has never been a care. My young partners did the work and I did the laughing, and I commend to your superintendents, and to yourselves, the thought that there is very little success where there is little laughter. The workman who rejoices in his work and laughs away its discomforts is the man sure to rise, for it is what we do easily, and what we like to do, that we do well.

"I know of nothing which lifts and improves the service of a great line and adds so much to its safety as a staff which can rest in the knowledge that after they have grown old in the service their old age is made comfortable through the system of pensions. Before long no line will rank as in the front rank which has not this invaluable, I might almost say necessary element in securing a staff of trustworthy, intelligent, and loyal men filled with esprit de corps for the company they serve. It is a great delusion to say that labor and capital are foes, they must be allies, or neither succeeds. I have before used the simile of likening capital, business ability and labor to the legs of a three-legged stool; the stool will not stand up without the support of all these three legs, and to dispute as to which of the three is most important is useless. It can never be determined, and if determined it would be of little consequence, since the great fact remains that they are all absolutely necessary for such success as we see on the New York Central railroad and other great transportation lines of our country."

ANOTHER EXPEDITION TO THE POLE.

A press representative has had an interview with Capt. J. E. Bernier, the Canadian explorer, who is organizing an expedition to the north pole. Since Capt. Bernier's last visit to England, when he lectured before the Colonial Institute, in January last, he has been in Canada, where he has secured the active support and co-operation of the Dominion government for his scheme. Capt. Bernier, who is devoting his services gratuitously, estimates the cost of his expedition at $150,000. Of this he has already secured $100,000, including a contribution of $7250 from the Dominion government, $5000 from Lord Strathcona, $1000 from Hon. R. R. Dobell, Canadian minister without portfolio, and $500 from the Earl of Minto, the Dominion governor general. He has also received large gifts from Canadian ministers, members of parliament, merchants and others. Capt. Bernier is now in London with the object of procuring from English subscribers the balance of $50,000 necessary for his scheme. The learned societies of Canada, including the Royal Society of Ottawa, the Quebec Geographical Society, and also the Royal Geographical Society, have all given their sanction to Capt. Bernier's scheme, and the Dominion minister of public works recently in the house of commons stated that "no man was better able to accomplish the object in view than Capt. Bernier."

Roughly, Capt. Bernier's plan is to build a special ship for the expedition of about 300 tons net, and with a staff of six scientists and eight navigating officers to proceed from Vancouver for Bering strait, touching at Port Clarence in Alaska for coal and supplies. From there the expedition would proceed due north to a position 150 miles northeast of the point where the American vessel Jeanette was caught in the ice, this track being the one used by various whalers, and also by the American surveying expedition of 1881. By this plan Capt. Bernier claims that he would only become jammed in the ice at a point some 150 miles nearer to the pole than the Jeanette. Drifting at the same rate as the Jeanette, Capt. Bernier says that he would pass within 100 or 150 miles of the pole in two years and a half. From that point part of the expedition would leave the vessel, after having made preliminary investigations of the ice. During these investigations the explorers leaving the ship will be in wireless telegraphic touch with the ship, and will plant at intervals of one mile numbered aluminum tubes, 18 ft. long, containing condensed provisions and acting as land marks. This portion of the work will be done by relays of men. Capt. Bernier himself will not leave the ship until these staffs have been erected to within about fifty miles of the pole. He will then leave his ship in charge of the second in command and proceed north until the pole is reached and soundings are taken. Capt. Bernier says that his expedition will be absent four years; but that, by his scheme and by the use of natural drifts rather than fighting against nature, he is confident that he will be able not only to reach the pole but also to secure the various scientific objects desired.

ITEMS OF GENERAL INTEREST.

The big battleship Illinois has just come out of the floating dry dock at Algiers, La., having successfully demonstrated the possibilities of that structure.

Will Fife, Sr., famous yacht builder, died at his residence in Fairlee, Scotland, last week. He was born about 1820 and had constructed some famous yachts, notably the Stella, Fiona and Latona.

The Craig Ship Building Co. of New Jersey has been incorporated with a capital stock of $1,250,000. Its charter permits it to manufacture engines and to construct and operate ships. The incorporators are C. V. Childs, James R. Mapleloft and H. N. Smith.

The steamship Nevadan, the second vessel to be turned out by the New York Ship Building Co., Camden, N. J., was launched this week. The Nevadan is 371 ft. over all, 46 ft. beam and 34 ft. deep. She is equipped to burn either coal or oil. The steamer was christened by Miss Mildred Morse, daughter of President Morse of the ship building company. The vessel is for the American-Hawaiian Steamship Co. of New York.

Railway journals note each week a line of orders for new cars, showing no interruption in the activity prevailing for a long time past in this important industry. Orders recently summarized by the Railroad Gazette aggregate 18,710 cars of different kinds. This does not, of course, include the big orders placed some time ago by the leading roads. It is a collection of smaller orders from the short lines that are following the lead of the big companies.

Representative Babcock's much-discussed bill has now been introduced in the house. It places a number of articles of the iron and steel schedule on the free list and materially reduces the duty on the rest. It is understood that the bill was framed after repeated conferences with the iron and steel interests, the purpose being to place the rates barely on a protective basis. The articles placed on the free list are the heavy products of the furnaces, while the rates on other articles of the schedule average about one-half the present rates.

THE SOUTH'S NEED OF AMERICAN SHIPS.

SENATOR M. A. HANNA IN THE TRADESMAN.

I am asked by the Tradesman to explain the south's need of American ships and the sentiment in the south toward subsidies as a means for securing such ships. It may come as a surprise to many to be told that in no part of the United States is the sentiment in favor of government aid for the upbuilding of our shipping in the foreign trade stronger than in the south. Even more strange, then, will be the further fact that the real sentiment of the south in behalf of shipping legislation finds so little expression in the halls of congress. The paradox exists of a great section of the country being almost a unit in favor of a certain specific form of national legislation to which nearly all of its representatives in congress are opposed.

For evidence of the actual southern sentiment regarding needed shipping revival legislation, through the financial aid of the government, we may take the expressions of representative associations of southern business men. I have yet to learn of a single southern business or commercial organization in which the subject of government aid to American shipping has been considered and opposed. On the other hand, there are numerous instances of record where such organizations have put themselves squarely on record in favor of such aid. Take the cotton spinners, as an example. With unvarying regularity, and earnest enthusiasm, the representative men in the annual conventions of the cotton spinners of the south call upon congress for legislation for the upbuilding of our shipping in the foreign trade. Learned addresses are delivered by men of eminence, and the enthusiasm shown at their delivery is unequalled by that shown toward any other special interest discussed. The delegates are unanimous in favor of the resolutions which advocate the subsidy policy. The same is true of other organizations which demand that the government extend its aid in sufficient amount to enable American ships to successfully compete with the cheaper-built, cheaper-operated, subsidized and bountied ships of other nations. The Southern Industrial Association's meetings have been notable for the fervor with which resolutions calling upon the government for speedy legislation for the upbuilding of our shipping have been adopted.

Less than a year ago a "maritime congress" was called by the governor of a southern state to be held in one of the seaport cities of that state. It was the urgent southern demand, localized in that particular state, which unquestionably led to the remarkable official call for a congress of those representing the shipping interests of the country. Responses were gratifyingly diversified and numerous. But suddenly the governor who had issued the invitation for the congress was beset with the fear that the congress might adopt a resolution in favor of subsidies. To prevent such an outcome he was frequently quoted in the press all over the country as dreading that some deep-laid scheme was being hatched to secure an expression in favor of ship subsidies. When the congress that he had called together assembled in the city he had designated, the governor found it inconvenient to attend to welcome his own guests. The congress was, with the exception of four delegates, composed of men representing southern chambers of commerce, boards of trade and similar bodies. The other four represented similar northern organizations. The resolutions adopted were strongly in favor of government aid for the building up of our shipping in foreign trade, such cities as Savannah, Charleston, Brunswick, Beaufort, Atlanta, Mobile, Pensacola and New Orleans being represented, the delegates from those cities in some cases being represented by their local trade organizations to use their utmost endeavors to secure indorsements of the subsidy principle for the building up of an American merchant marine. Such a conservative and progressive organization as the Richmond, Va., chamber of commerce adopted resolutions favoring government aid for American shipping. The American Shipping & Industrial League, an organization formed by southerns nearly twenty years ago, membership in which is largely composed of southern business men, and of which one of the most representative of southern shipping men is president, is earnest and active in demanding the nation's direct financial aid for American shipping revival. The Trans-Mississippi Commercial Congress, in which southern men have for years been dominant, is recorded in favor of subsidies through what is perhaps the strongest resolution on that subject ever adopted by any organization in the country.

During the summer of 1900 a strong southern organization held its annual convention in a southern city. It was the custom of that organization to name a committee each year to prepare an address and resolutions for adoption at the succeeding year's convention. When the committee in question made its report in 1900, it was received with every manifestation of approbation, and was about to be adopted, when a delegate arose and suggested that its recommendation savored very strongly of those that had but a few weeks before been adopted by a national political organization, in that it favored expansion, the development of wider markets for our surplus products, ship subsidies and the gold standard. The prejudices of a lifetime were at once aroused and the debate became political instead of commercial, with the result that the address and resolutions were recommitted to the committee that drafted them with instructions to reconsider them. After spending many weary hours upon such an effort, the committee finally reported to the effect that it could not arrive at conclusions contrary to those expressed in its original report and resolutions, but, in view of the political campaign then on, it advised that the adoption of any address and resolutions be deferred until the next annual meeting, and which suggestion, for harmony's sake, was carried.

The leading commercial organization in what is perhaps the busiest industrial city in all the south, a city that is sometimes referred to as "the Pittsburg of the south," and which has promise of rivaling if not surpassing the Pittsburg of the north, adopted strong resolutions at one of its regular meetings, after extended discussion, and almost without a dissenting vote, strongly favoring subsidies for American shipping. Subsequently it was recalled that the representative in congress from that district had some time before made a speech in the house of representatives in opposition to a ship subsidy bill then pending, whereupon, at a later meeting of the association, the shipping subsidy resolution was reconsidered and laid upon the table. The Merchants' Exchange of St. Louis, Mo., the Business Men's League of Hot Springs, Ark., Board of Trade and Business Men's Association of Norfolk, Va., Board of Trade of Little Rock, Ark., the St. Louis Drapers' & Tailors' Exchange of St. Louis, Mo., the Live Stock Exchange of Fort Worth, Tex., the New Mexico Trans-Mississippi Exhibition Commission, the Alabama State Grange, Patrons of Husbandry, Kentucky Millers' Association, the Fort Smith, Ark., Furniture Association, the Carpenters' Union of the same city, the Tarboro Board of Trade of Tarboro, N. C., the Fruit and Vegetable Association of Hitchcock, Tex., and the Joplin Club of Joplin, Mo., are a few of the southern organizations that, I am most reliably informed, have, at one time or another, by formal resolutions, favored subsidies or government aid for our shipping. One of the strongest speeches made in the senate last winter in favor of the then pending ship subsidy bill was made by a southern senator—one of the rare exceptions to the general rule of hostile southern congressional representatives.

I cite these facts, in possibly too extended detail, in order to show that, however little the expressions in congress from southern representatives may be in favor of shipping subsidies, there is a strong, enthusiastic and growing sentiment all over the south in favor of the policy of government aid for our declining shipping industry. Being asked by a southern publisher to state what the sentiment is in the south, the foregoing details are pertinent. The question might naturally follow, why is it that the business men of the south submit to misrepresentation in vital matters of national legislation? The answer is that racial matters, affecting social conditions, have for a generation overshadowed differences regarding economic policy. Those whom the people of the south have felt most disposed to trust to safeguard them from the evils they have feared in this respect have, with singular unanimity, belonged to a school of political economy, which, save once, has secured no foothold in national legislative enactment during the past forty years. The people of the south, therefore, seem willing to permit themselves and the nation to be handicapped by the prejudices arising from a tenacious—one might almost say hereditary—adhesion on the part of their political representatives to an economic theory that our national expansion has entirely discredited. Through the growing participation of a new and younger generation in public affairs this unfortunate condition in the south is being gradually overcome, and it is to be hoped that it will soon become strong enough to emancipate the nation from its pernicious restraint upon our national development. It so happens, and most fortunately, that the south will become one of the greatest, if not the greatest, beneficiaries, as the years roll on, of the very policy to which, as a section, it has so long been opposed. A realization of this important fact is sure to have a potential influence in the impending southern readjustment of its economic principles.

With the future development of southern cotton and iron manufacturing, and the wider diversification of its industries, with the pressing need of foreign markets for its surplus products, with the possibilities increasing of extending its trade with its neighbors in Central and South America and the West Indies, and the construction of an isthmian canal with all of its great opportunities on the west coast of America and in the far east, the sentiment of the south will unify in a demand for an American mercantile marine as the chief instrumentality through which to best serve and promote its interests. Lacking a shipping of its own, built by its own workingmen, owned and manned by its own citizens, the nation, and no less so the south, will clearly realize that there will be a drag upon its future industrial development and commercial expansion that will be intolerable. It is by no means too much to expect that the south will become the chief center of the ship building industry in the years to come, through the possession of such apparently unlimited resources in the basic materials from which ships are constructed, through sources of labor supply that are ample, through superior climatic conditions, and through increases not alone in production, the surplus of which must be disposed of abroad, but through the growing trend of our exportations through southern and especially gulf seaports.

To say, with truth, that the cost of building ships in the United States and of operating them under the American flag is greater than the cost of building them abroad and operating them under foreign flags, is not to disclose an insuperable bar to American construction and ownership. On the contrary, it is of a character to inspire us with a determination to overcome our disadvantages, by no means for the sake of the ship builder or the ship owner, but for the sake of the nation, which needs the resource and defense that inheres in a home-built, home-owned and home-manned shipping of its own. But, when we find that, in addition to being able to build and operate ships more cheaply than ourselves, foreign nations expend vast sums annually in the way of subsidies and bounties in order to secure a shipping of national character, the conviction is forced upon us that the military necessities which induce our foreign rivals to resort to these expedients must be equally as potential with us. We cannot, with our vast and growing commerce, pay for the foreign ships and the education of the seamen to attend to its transportation, as we now do, without realizing that in thus arming our rivals we are weakening ourselves, conditions that the wisest statesmanship and the most sagacious economic foresight should be applied to the speedy reversal of. And to the extent that we permit our minds to become blinded to these paramount considerations in dealing with this question, to the extent that we contemplate merely the incidental benefit that will be bestowed upon the individuals whose ships it will be our duty to extend the nation's aid to, to that the extent we are being deluded by those whose interests or prejudices are best served by continuing our almost entire dependence upon foreign shipping for the carrying of our great and growing exports and imports.

The shipping question is a purely national question, and it is of direct and deep concern to each section of our country. Interwoven with it are considerations of national strength and safety which, in time of need, no money can purchase, no regrets atone for the loss of. Our duty to ourselves, as a nation, makes imperative the use of national funds for the promotion of the national welfare through the upbuilding of this great and valuable industry, until its growth and extent are such as to enable it to thereafter develop of itself, and unaided by our national treasury, a condition that the growth of other of our great industries that have received the protection of the government justifies us in believing will be reached with satisfactory promptitude.

OCEAN TRANSPORTATION FOR COAL.

BY ROBERT P. SKINNER, CONSUL-GENERAL TO MARSEILLES.

I am asked to supply definite information on the subject of heavy transportation of coal from Great Britain and America to France, for the purpose of demonstrating the propriety of building special coal-carrying steamers. In the actual condition of the carrying trade, the complaint of all owners is that the business is being done on unprofitable terms, if not with absolute loss to themselves; 5s. 6d. (equal to 7 francs, or $1.35) per ton from Cardiff to this city is at this writing a high price. More charters are being written at $1.20, and they hover between the two extremes. From Baltimore or Newport News to Marseilles, the present price is fairly firm at 9s. ($2.25), and the difference between these rates is $1.10. Hardly more than a year ago, the difference between coal rates from Baltimore and from Cardiff to Marseilles ranged from $2 to $2.30. While the depreciation in freight rates is very generally explained by the release of tonnage heretofore required by the British government for war operations, the superabundance of new tonnage and the large number of ships contracted for and in process of construction, the change in the relative difference between the rates from Cardiff and Baltimore to the Mediterranean is attributed to special conditions. It is pretended that a very large number of steamers have recently gone to the United States for grain or cotton which have not been offered for shipment, and that these ships have therefore been forced to take what they could get in the way of cargo, upon any terms, with the result that the relative difference between American and British coaling ports has been hammered down fully 50 per cent. My informants believe that when this large quantity of tonnage now in American waters returns to this side, it will engage in whatever may be offered in Europe at that time, in preference to repeating the operation of carrying coal at 9s.; since, while there may be no money in bringing British coals into the Mediterranean for about 5s., there is always an opportunity to go from Marseilles to the Black Sea or to Spanish ports, where grain or iron ore may be picked up for delivery in England, while there is substantially nothing in the way of cargo to be taken back to New York.

A steamer of 3,000 tons cargo capacity can today load at Cardiff with navigation coal of the type usually required in this city at 12s. ($2.92) a ton. Assuming the owner to have contracted for payment at the rate of 7 francs ($1.35) per ton for freight (and this is today the very outside price), he must calculate upon expenditures amounting in all to 5.30 francs ($1.02) per ton before he can begin to take into consideration depreciation and profit. The official charges would perhaps vary somewhat from the figures I am about to give, but experience shows that upon a vessel of 3,000 tons the items of expense per ton, amounting to 5.30 francs, actually average as below. Assuming that the local charges at Baltimore would be the same as at Cardiff, and making due allowance for the increased length of the voyage, I establish the comparative cost per ton of delivering 3,000 tons of coal at Marseilles from either Cardiff or Baltimore as follows:

	Cardiff.		Baltimore.	
Description.	Francs.		Francs.	
Trimming at Cardiff and port charges....	0.70	$0.135	0.70	$0.135
Port charges at Marseilles.....	.60	.115	.60	.115
Discharging at Marseilles.....	1.25	.241	1.25	.241
Deduction on freight (a common practice in lieu of re-weighing).....	.50	.096	.50	.096
Fuel for voyage (10 tons per day, costing 12s. at Cardiff or 8s. at Baltimore)*..	.50	.096	.65	.125
Wages and ship general expenses, at £10 per day (about).....	1.75	.337	2.65	.511
Total cost per ton.....	5.30	1.02	6.35	1.22

*Steamers from Cardiff require three days for loading, ten days for the voyage, five days for discharging, and two days allowance for Sundays and holidays—twenty days in all; steamers from Baltimore require twenty days, instead of ten, for the voyage—thirty in all.

Thus, the owner shipping from Cardiff may look for depreciation, repairs, and net profits from the difference between 5.30 francs and an extreme of, say 7 francs per ton, while the owner shipping from Baltimore must look for his from the difference between 6.35 francs and 11.25 francs—the apparent discrepancy being very much to the advantage of the steamer from Baltimore. But it requires one-third more time to ship from Baltimore, and the prospect of return cargo, moderately certain in the first case, is equally remote in the second. It will be noted that in practice, as much time is required for loading and discharging cargo from Cardiff as the voyage, properly speaking, demands, and it may be assumed that one of the first efforts of American navigation companies will be to reduce this extended period. Demurrage charges in this port are practically unknown, and discharge facilities are at present limited to 600 tons per day. The market becomes a more valuable one every year, the tendency of the established lines being to frequent this port for the purpose of coaling, and the total annual requirements having doubled within the last three or four years. There is also a prospect of supplying the Swiss market from this port, and to that end the Paris, Lyons & Mediterranean Ry. Co. has prepared a tariff reducing the rate from Marseilles to Geneva from 14 francs ($2.70) to 11.85 francs ($2.28) per ton. This tariff requires the sanction of the minister of commerce before it can become effective, and for some unknown reason this sanction has not yet been obtained. If the lower rate is adopted, it is moderately certain that a very considerable interior business will be done in consequence.

Except for the troublesome question of return cargo, it would be easy to assert that the American voyage, including delays for loading and discharging, being one-third longer than the Cardiff voyage, requires in fairness a rate only one-third more than that of the latter, the longer time at sea being perhaps overcome by the advantage of cheaper fuel. In practice, the American exporter is at present paying more than this one-third, and there never was fair ground for the former difference, which ranged from 7s. to 12s. ($1.70 to $2.92.) Whether general rates be high or low, something like 1,000,000 tons of foreign coal must be laid down annually in Marseilles, and the fluctuation in the relative rate from Cardiff or Baltimore will largely determine the proportion of American trade in this region.

Standard navigation coal from Cardiff is today selling at 22s. ($5.34) in Marseilles. It costs 12s. ($2.92) at Cardiff, or 13s. ($3.16) with the export tax included. American competing coals are being sold here at a discount of 1s. 6d (36 cents.) Experience and prejudice, or whatever the controlling causes have been, have set this margin as a measure of comparative quality. American coal at the seaboard, then, must be sold low enough to cover the higher freight charge and a persistent prejudice because of quality. The items average now from 4s. to 5s. In other words, it must be sold, quality for quality, at f. o. b. prices dangerously near 8s., or perhaps 9s. ($1.94 or $2.19), and every cent under these figures represents the advantage which our dealers have in the Mediterranean market at present. We have sold 184,797 tons of American coal in Marseilles during eleven months of 1901, against 941,171 tons of British coal. It gave entire satisfaction. I have before me a letter from Worms & Co., the heaviest single importers, in which they say: "Our importations of American coal during the year will approximate 100,000 tons. The principal companies to which we have sold it regularly are the Peninsular & Oriental Steamship Co., the British India Steam Navigation Co., the Nippon Yusen Kaisha Steamship Co., and the Messageries Maritimes Steamship Co. They have all declared themselves very well satisfied with the quality of the fuel."

The steamship companies to which Messrs. Worms & Co. refer are the largest doing business in the Mediterranean. During the year, local selling prices went to pieces, and a dealers' war has prevailed until a week or two ago. This has involved the making of many contracts for next year's delivery at prices certain to net a loss of from 30 to 75 cents per ton, unless market conditions change materially. One dealer has figured out for me about 500,000 tons already contracted for, and seems to think that these contracts will tend to diminish American importations next year. I do not think so. The Paris, Lyons & Mediterranean Ry. Co., which requires 300,000 tons, has not yet closed, I understand. All this is guesswork, to some extent. There is no war either for or against American coal. It has demonstrated its excellence, and it will come in when the price permits it. Meantime, the war between the dealers has ceased, and they are taking no new contracts at less than 22s. ($5.34.) American anthracite in the meantime has invaded the market, and would control it were not the fuel itself so hard to secure. With American mines taxed to supply domestic demands, it may be said that the European is at present more interested in American competition here than is the American himself.

As the case stands, dependent as we are upon foreign ships, we are in the Mediterranean coal trade, and we can probably remain, but there is always an "if." If, as at the height of the war excitement, we must again pay 21s. ($5.10) while Cardiff pays but 10s. or 12s. ($2.43 to $2.91) it is obvious that we can not cut our f. o. b. prices to that extent. That we could pay that enormous freight at one time was only because the f. o. b. prices at Cardiff were well over twice what they are today. Thus, while reasonable business policies encourage faith in the permanency of our Mediterranean coal trade under existing conditions, the mere memory of freight rates once paid is a standing menace. I have always contended, and still maintain, that our commerce in coal can be guaranteed only by the land transportation lines engaging in the ocean carrying trade. Even a very small fleet of colliers controlled by the coal roads would provide a steadying influence of inestimable value. It may be doubted whether the owners of colliers are losing anything today, in spite of their cry of distress. They have been enjoying abnormally high prices, and the years of plenty have been followed by a year of famine. Business is dull everywhere except in the United States, and even there the freight furnishers are refusing to ship, hoping for better times abroad. In shipping circles, a gradual stiffening is anticipated soon. As an independent proposition, the creation of a fleet of coal carriers—particularly if they should be of modern type, capable of loading and discharging promptly—seems favorable, and, contemplated as an enterprise of one of the seaboard coal roads, it is not only attractive, but almost an imperative requirement. The foreign market is the only thing that will guard the mining companies from stagnation, in the event of dull domestic trade. The threatened through bill of lading from the mine to the consumer abroad is one of those moral influences that is today holding down the level of ocean freight rates. A gentleman largely interested in foreign transport enterprise tells me that every Atlantic carrying company is shortening sail with a view to this contingency. He says:

"The American railroads are so important in themselves and drain such vast producing areas, thus contributing the bulk of east-bound freight, that they cannot afford to remain in any sense dependent upon foreign navigation companies to take these goods to market. Whether they buy us out and run our ships for their own account, or secure legislation which will lead to the construction of a purely American fleet, it amounts to the same thing in the end. The railway companies can stand hard times as well as the British ship owner, and when the good times come their stockholders will pocket the profits, instead of ours. The through bill of lading would simply leave us without anything to stand upon, in so far as American trade is concerned."

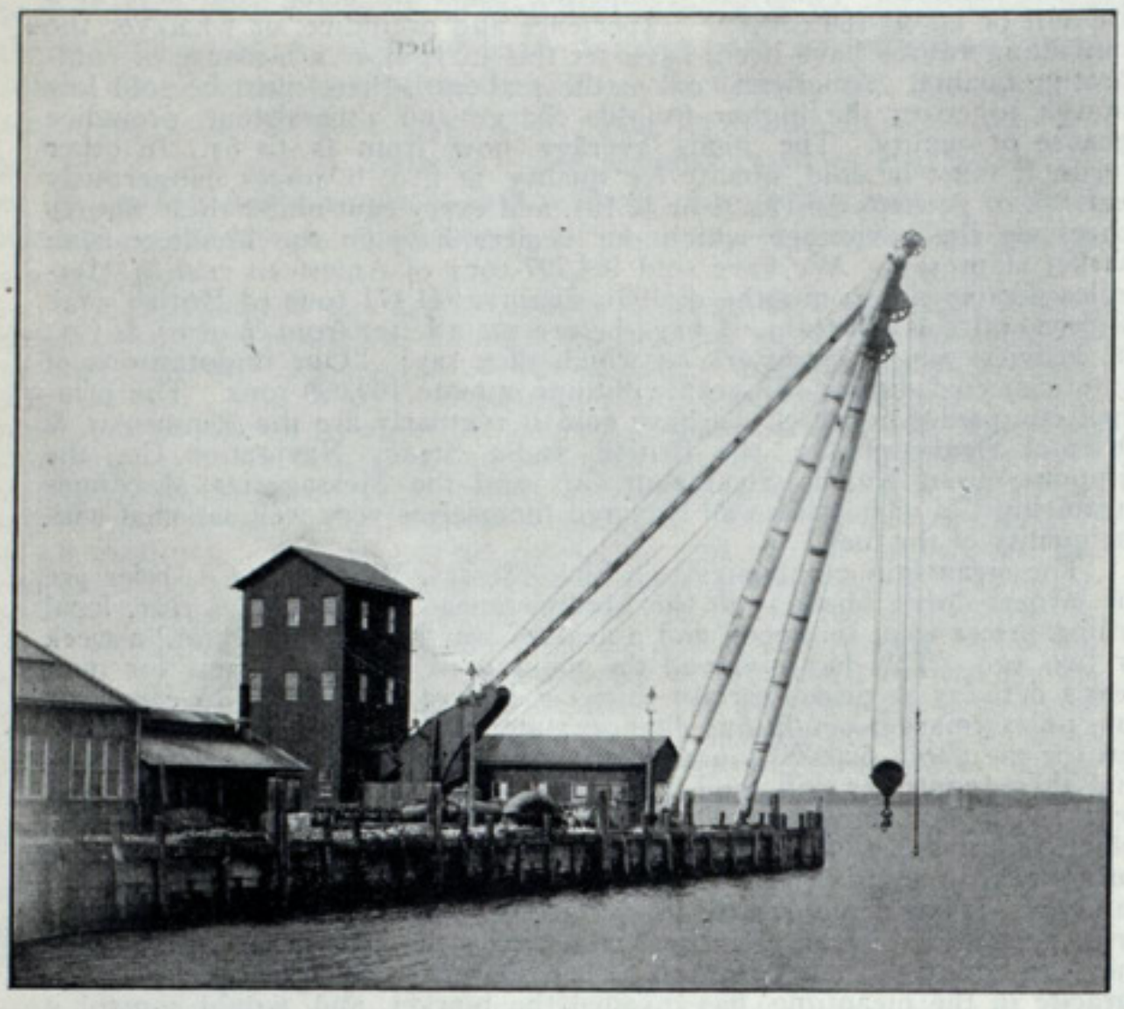
Owing to extensive improvements in its plant and the large volume of business on hand, Moran Bros. Co., Seattle, Wash., have issued bonds to the extent of $500,000, secured by a mortgage on the property. It is understood that every bond issued has been sold.

The canal association of greater New York has indorsed recommendations made by Governor Odell in his recent message to the legislature for the extension and enlargement of the canal locks to 1,000 tons capacity and the deepening of the Erie canal to 9 ft.

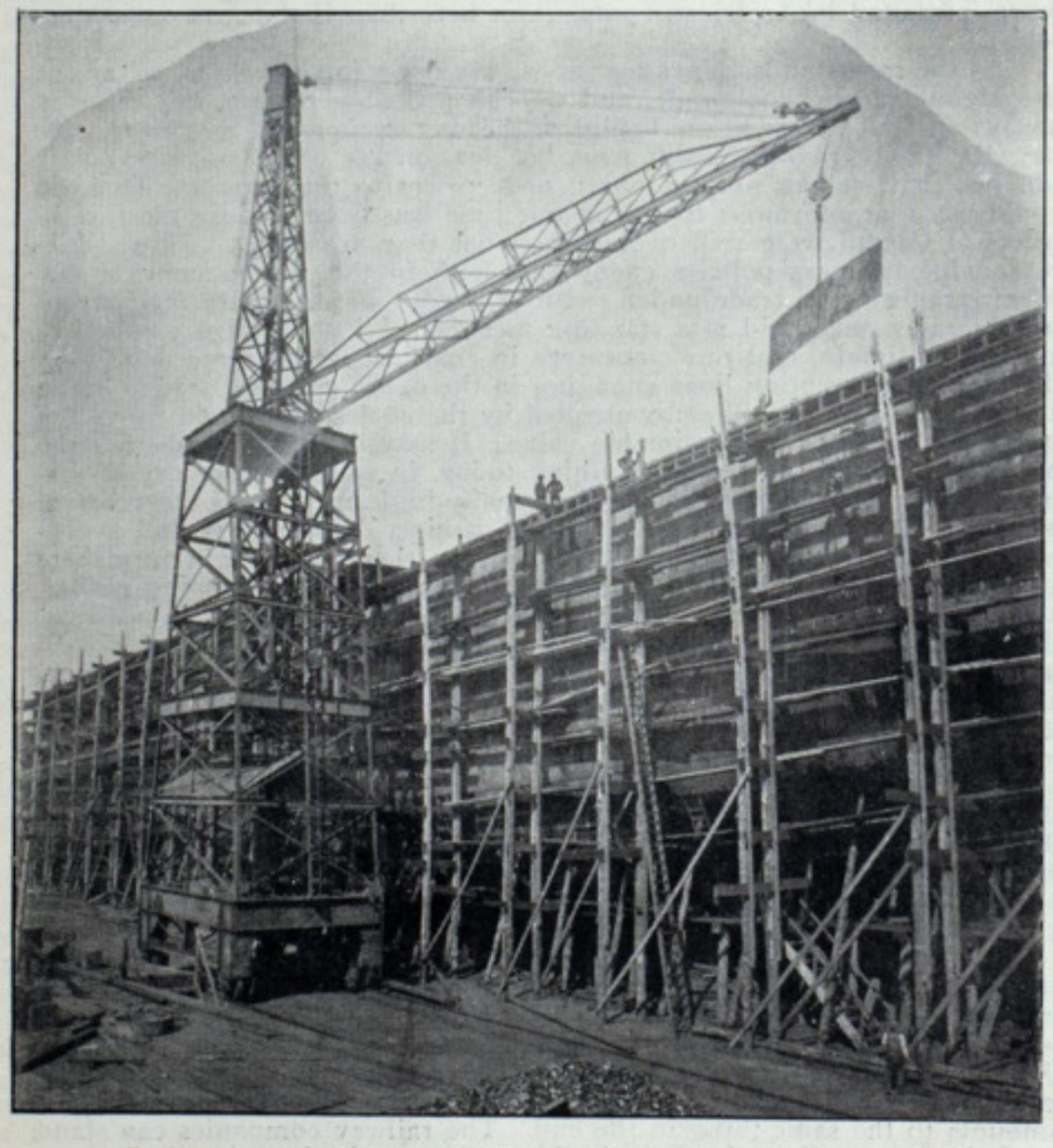
Rear Admiral W. K. Van Reypen, chief of the naval bureau of medicine and surgery, will retire voluntarily on Saturday of this week with the rank of senior rear admiral and will be succeeded by Medical Inspector Presley M. Rixey, who has now the rank of commander.

MARYLAND STEEL CO.'S PLANT.

One of the busiest ship yards in the country, and one having important contracts under way and others in contemplation, is that of the Maryland Steel Co. at Sparrow's Point, Md. The plan published herewith shows the arrangement of the ship yard. The yard has been remodeled and equipped with new tools and handling appliances. The launching ways are capable of taking four 650-ft., one 400-ft. and two 350-ft. vessels at one time, besides two of smaller dimensions, making a capacity of nine



125-ton shears at Maryland Steel Co.'s works, Sparrow's Point, Md.



Derrick crane, capacity 25,000 lbs., at Maryland Steel Co.'s works, Sparrow's Point, Md.

vessels in all. These ways are served by derrick cranes which are capable of handling all material to be placed upon vessels before launching. The tool shed has also been enlarged and equipped with new tools. A traveling derrick crane of 15,000 lbs. capacity has been installed on the extension of the fitting-out wharf. A 125-ton shears is also a feature of the wharf.

National officers of the American Association of Masters and Pilots, elected at the annual meeting in Washington, are: Grand captain, J. C. Silva of Buffalo, re-elected; first pilot, Charles Maytham of Buffalo; second pilot, N. L. Cullin of Camden, N. J.; grand purser, L. B. Dow; captain's clerk, B. F. Perkins.

The submarine torpedo boats Pike and Grampus, which are now under construction at the Union Iron Works, San Francisco, will be launched about Feb. 1.

SUCCESSFUL TEST OF A SUBMARINE BELL.

It is announced that a discovery which will stir scientists the world over into new activity was made in Boston harbor recently when representatives of the Submarine Signal Co. of Boston found that the blows on their submarine bell, striking in the upper harbor, caused vibrations in every vessel in port, and furthermore, that the sound could be heard distinctly by simply placing the ear against wharf piles. According to the story of one who helped in the experiment an attempt was made at the time to learn if the sound from a bell could travel from one side of the harbor to another, successfully pass all obstructions, and pierce the thick skin of an ocean liner so that the sound might be received in some parts of the steamship. Accordingly the company's barge, Sea Bell, with striking apparatus, was stationed at the New England docks and representatives of the company were privileged to station themselves in the shaft tunnel of the Cunard steamship Ivernia.

The Ivernia is the largest vessel entering at the port of Boston. Her outer skin is fully an inch thick, and besides having on board a considerable amount of cargo at the time of the experiment she was receiving her coal supply, the noise and commotion therefrom being considerable. At the appointed time the striking apparatus on the Sea Bell was put in motion, and to the amazement of those stationed in the Ivernia the sound not only pierced the skin clearly and unmistakably, but it came so freely that even its direction was apparent. One doubting Thomas suggested that it was not the water which so tremendously increased the force of the sound but rather that it was by contact and passage through the mud on the East Boston side. In order that there might be no doubt whatever on this point, tests were subsequently made at both high and low water, and it was found in every instance that the sound was more forceful and clearer at high water than at low water.

At the time of the experiment with the steamship Ivernia there were a number of coal-laden schooners of the larger type in the harbor, some even intercepting the straight line between the Sea Bell and the steamship. These ships draw from 15 to 24 ft of water, and yet they in no way lessened the sound. Furthermore, the 800-lb. bell, almost one mile from the steamship, was struck with a force only equal to a 1-ft. fall of a 50-lb. piledriver; whereas it could easily have been given a force many times as great. Those directly interested in the new invention claim that under anything like favorable conditions the sound can be heard and located a mile away, and a warning given to ships in dangerous localities.

For instance, during the last year four steamers and one barque have gone ashore at Cape Race, on the coast of Newfoundland, representing a money loss of several million dollars. None of these vessels received warning from the fog horns which guard that point, yet if the coast there had been equipped with submarine bells it is claimed that it would have been utterly impossible for any of the vessels spoken of to have approached nearer than one mile without receiving warning of their peril.

It is from the scientific as much as the practical standpoint that the numerous discoveries being made in submarine signalling are of interest. Until Arthur J. Mundy and the late Prof. Elisha Gray began a series of experiments which led to the establishment of the new company, this branch of science had been somewhat neglected. Its promoters are compelled to explain every new discovery from their own observations and experiments; nothing in the scientific textbooks gave any light as to cause and effect. It is because of this lack of material at hand that a "log" is being kept of every detail of the invention. Each discovery is noted down by careful and conversant writers, and every experiment is given a place in writing. Foreign governments are watching its growth with an eye to the future, and especially its uses in case of war. A representative of the Argentine government has been in consultation with the officers of the company, and one foreign power has requested that the Submarine Signalling Co. be moved bodily to that country, and all further experiments be conducted there. This offer was chiefly due to the desire to increase the efficiency of the navy; but it was stated by Manager J. B. Millet that the Submarine Signalling Co. has no desire to accept the invitation, for its purpose is, first of all, to provide a safeguard for the Atlantic coast of the United States.

SCANDINAVIAN SHIP BUILDING, 1901.

A large number of vessels were built last year in Norwegian, Swedish and Danish ship yards, and from most of those establishments more tonnage was put into the water than in 1900. The increase was especially great in the case of Messrs. Burmeister & Wain, Copenhagen, and of the Akers Mekaniske Verksted, Christiania. Eight vessels were launched from Messrs. Burmeister's yard, of a total measurement of 9,398 tons, and with engines aggregating 16,250 I.H.P. The majority of them were medium-sized cargo steamers, but one was a cruiser for the Russian government, of 3,300 tons and 12,000 I.H.P. This last-mentioned vessel is probably the finest and swiftest ship ever built at Copenhagen. Messrs. Burmeister & Wain were also busily engaged all the year with repairs, the number of vessels docked or hauled on to the slip for repairs having been 295, measuring altogether about 401,000 register tons, against 270 ships and 350,000 tons in the previous year. The Elsinore Ship Building & Engineering Works turned out four cargo steamers, measuring in the aggregate 6,383 register tons and of 3,250 I.H.P., for Scandinavian ship owners, which is a considerable falling off when compared with the year 1900. At the Lindholmers yard, Gothenburg, two steamers (5,700 register tons and 6,700 I.H.P.) were built, one of them being a cruiser for the Swedish navy, and the other a petroleum tanker for Russian owners. At the three principal ship yards in Norway—the Akers Mekaniske Verksted at Christiania, the Bergens Mekaniske Verksted, and the Mekaniske Trondjems Verksted—there were built and engined eleven vessels (5,091 tons), four vessels (4,414 tons), and four vessels (3,418 tons), respectively, being an increase when compared with the year 1900. Most of the vessels built in Norwegian yards were handy cargo boats or trawlers. One of the trawlers measured 97 tons and had engines of 250 I.H.P. She was built for a firm at St. John's, Newfoundland.

Ernest Victor Clergue, one of the directing heads of the associated industries at Sault Ste. Marie, Ont., died in Chicago last Saturday of heart trouble. Mr. Clergue was forty-one years old. His brother, Francis H. Clergue, is the head of the industrial syndicate at the Sault.

LAUNCHING EMPEROR WILLIAM'S YACHT.

The secretary of the imperial admiralty, Admiral von Tirpitz, and the chief of Emperor William's personal military staff are to accompany Admiral Prince Henry of Prussia to the United States. The other members of the prince's suite will be Vice-Admiral Baron von Seckendorf and Adjutants von Schwind and von Egidy, Capt. von Trotha, the emperor's aide-de-camp, Capt. von Mueller, Com'dr von Grumme and Staff Surgeon Reich. Admiral von Seckendorf, who announced these selections, said:

"The emperor personally is making all the arrangements that can be made on this side. The details as to how Prince Henry shall spend his time in the United States are left to Secretary Hay and Dr. von Holleben, but our general idea of the dates is this: We arrive on the Kronprinz Wilhelm Feb. 22 at New York, and not at Hampton Roads, as first reported. Prince Henry will go on board the Hohenzollern and will stay there till the launching of the emperor's new yacht. We go to Washington to see the president, and, perhaps, stay there several days. Then we make the most of the next few days in seeing other cities, returning to New York for two more days before we sail for home on the Deutschland, March 8. This general design, you see, fills up about four weeks—one week in going each way and a fortnight in the United States."

It was suggested to Admiral von Seckendorf that two weeks were not enough for the prince to see much of the United States, and that he ought to spend a longer time, and go west and south, to which he replied:

"It would be difficult for his royal highness to spend a much longer time, though the Deutschland's sailing can be delayed a day or two, if it seems desirable. An invitation from Chicago is mentioned, I see, but I am unable to say whether it will be accepted. That will be left to your people. Prince Henry simply wishes to spend his time as Washington may think to be to his best advantage. He looks forward with keen interest to the trip, and expects to get pleasure and instruction out of it."

Regret was expressed at the fact that the emperor could not visit the United States.

"He would like to," said Admiral von Seckendorf, "but we cannot spare him for so long a journey now."

The admiral was asked if it was possible the emperor might visit the United States at some future time.

"It would please him greatly," he answered. "It is not an impossibility."

Admiral von Seckendorf visited Norfolk in 1860 on the Prussian warship Victoria, and was at San Francisco in 1872 on the old German warship Hertha, which has since been replaced by a new cruiser of the same name. The old Hertha was the first imperial German warship to visit the Pacific coast. She went to San Francisco after leaving Japan. He has vivid recollections of San Francisco and his fortnight's entertainment there. Emperor William has ordered the Hohenzollern to be fitted out with all the accessories used when he is on board the yacht.

Mr. William Wallace Downey of the ship building firm of Townsend & Downey, which is building the yacht, has called upon President Roosevelt and arranged for the launching. The ceremony will be quite an elaborate one, the president himself going to Shooter's Island to see his daughter christen the yacht. President Roosevelt will officially meet Prince Henry in Washington.

"The president," Mr. Downey said, "was at first in favor of having the yacht launched on Feb. 27, but when I told him that the tidal conditions would be more favorable on Feb. 25, he said he could arrange his engagements to suit that date. Admirals Evans and Crowninshield and the German ambassador sanctioned this. We have not decided at what point we will take the president and his party aboard one of our steamboats for transportation to Shooter's Island. It may be at the Battery. We will issue about 2,000 personal invitations to the launching and we will see that all our guests get an unobstructed view of the ceremonies. We have been flooded with offers from German singing societies and bands to furnish music at the launching, but we think the government bands will be all that can be accommodated."

The yacht will be christened the Meteor. She will be ready to sail by March 15.

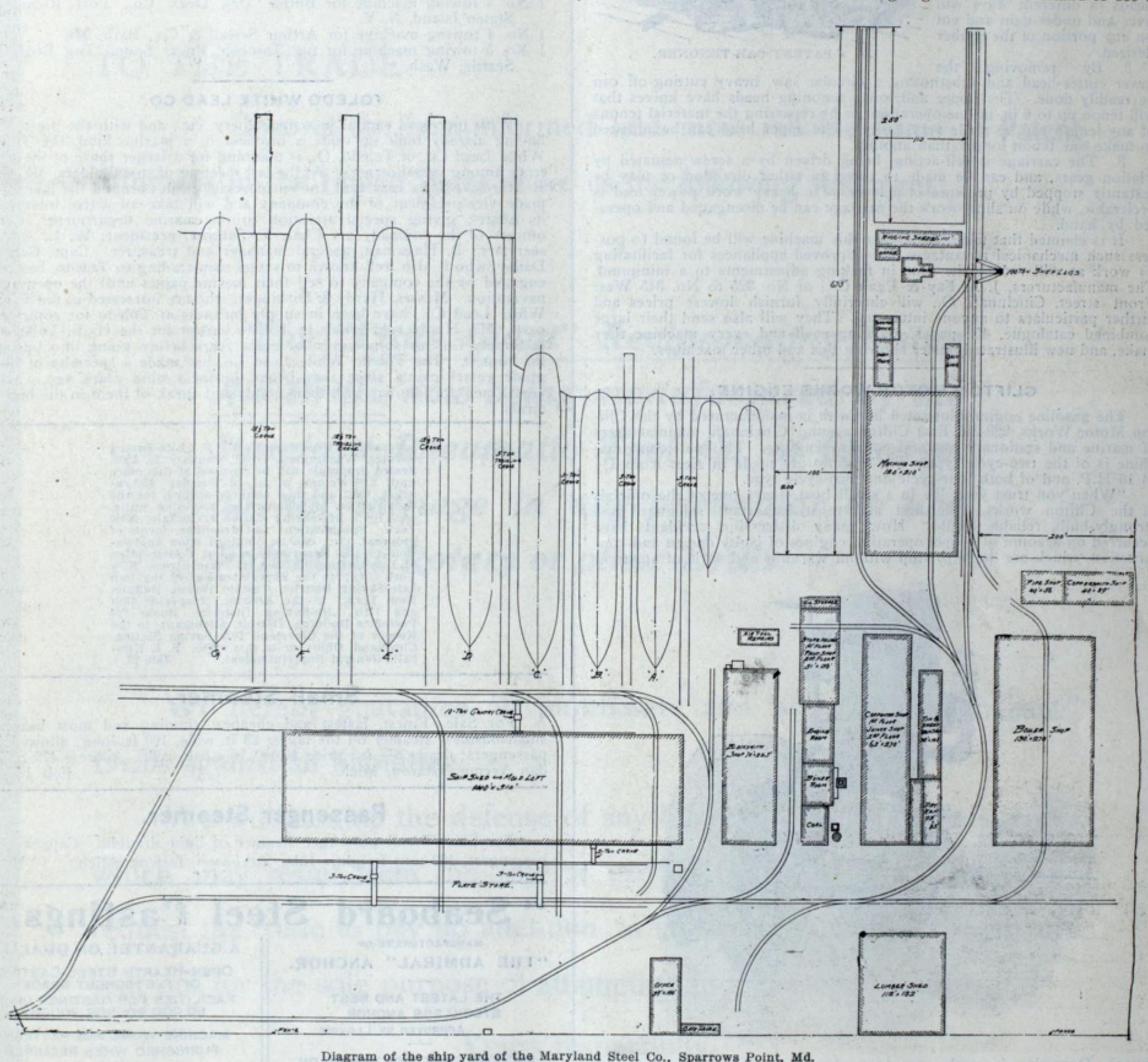
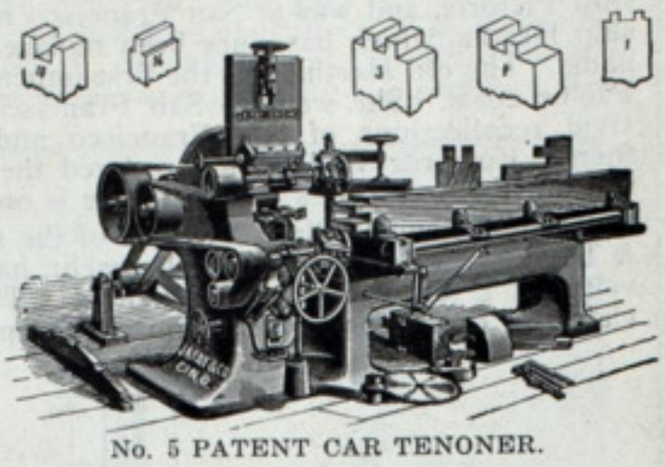


Diagram of the ship yard of the Maryland Steel Co., Sparrows Point, Md.

For navigation charts apply to the Marine Review.

NEW CAR SHOP TENONER.

One of the most powerful tenoning machines ever built is here illustrated. Owing to its range of work, and the amount and kind of work it will do, the manufacturers place it on the market firmly convinced that it is one of the best machines ever offered to ship builders, car builders, and in fact all concerns that have heavy and general work to do. Some of the claims made for this machine by the manufacturers are:



No. 5 PATENT CAR TENONER.

1. It will do single, double or triple tenoning, and also cut off and gain to the very best advantage, and by adjusting the gaining heads in different ways will over and under-gain and cut on any portion of the timber desired.

2. By removing the lower cutter-head and substituting a circular saw, heavy cutting-off can be readily done. The upper and lower tenoning heads have knives that will tenon up to 6 in. in one operation, or by repassing the material tenons of any length can be made very easily. The upper head can be adjusted to make one tenon longer than another.

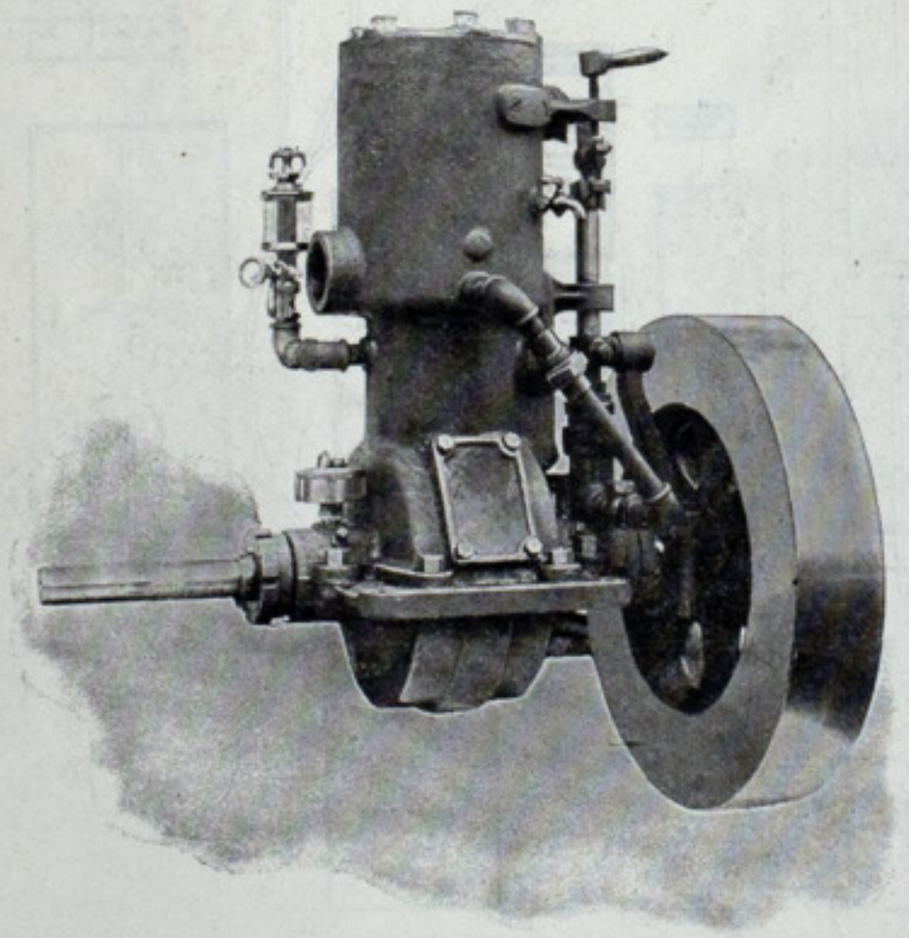
3. The carriage is self-acting, being driven by a screw actuated by friction gears, and can be made to travel in either direction or may be instantly stopped by pressure of a lever. On heavy work power feed is preferable, while on short work the carriage can be disengaged and operated by hand.

It is claimed that taken altogether this machine will be found to possess such mechanical advantages and improved appliances for facilitating its work as will reduce the time in making adjustments to a minimum. The manufacturers, J. A. Fay & Egan Co., of No. 325 to No. 345 West Front street, Cincinnati, O., will cheerfully furnish lowest prices and further particulars to anyone interested. They will also send their large combined catalogue, 450 pages, showing each and every machine they make, and new illustrated poster showing this and other machines.

CLIFTON MOTOR WORKS ENGINE.

The gasoline engine illustrated herewith is manufactured by the Clifton Motor Works, 229-231 East Clifton avenue, Cincinnati, manufacturers of marine and stationary gas and gasoline engines. This particular machine is of the two-cycle type. The engines are made in sizes from 1½ to 16 H.P. and of both four-cycle and two-cycle type.

"When you trust your life in a small boat," says one of the officials of the Clifton works, "the first and most important safeguard is a strongly-built, reliable engine. How many distressing accidents have occurred on account of people operating engines of faulty design and construction, which are liable to stop without warning and without apparent



cause? Departing from the usual practice we have considered in the design of this engine every possible weak point and eliminated it. The usual and most common difficulty with two-cycle engines is leakage from the crank chamber past the shaft as soon as the bearings become slightly worn. The remedy for this is to put a stuffing box on each bearing, and that is what has been done in this engine. Now a stuffing box on the after bearing means placing the ball-thrust bearing in some other location. This has been done, and the thrust bearing is where it should be—inside of the crank chamber, forward of the crank, where it is thoroughly oiled and protected. These features may be considered but minor and unimportant, but it is the details that make up the whole. All other details about this engine have been worked out with the same painstaking care, and the result is a most symmetrical and pleasing engine."

The Townsend-Downey Ship Building & Repair Co. of New York has been incorporated and its capital stock increased from $1,000,000 to $3,500,000. The company's plant on Shooter's island, New York, now covers about fifteen acres of land. It is the purpose to extend it considerably by the erection of additional shops.

ORDERS FOR TEN TOWING MACHINES.

In the fifteen days between the 1st and 15th of the present month the American Ship Windlass Co. of Providence, R. I., manufacturers of the Shaw & Spiegle patent automatic steam towing machines, booked orders for ten of the machines. The orders are from ship building concerns that are building some of the finest freight carriers in the country. The list is as follows:

1 No. 4 towing machine for Buffalo Dry Dock Co., Buffalo, N. Y.
1 No. 2 towing machine for New York Ship Building Co., South Camden, N. J.
1 No. 3 towing machine for steamer Wallula, Oregon Railway & Navigation Co., Portland, Ore.
1 No. 5 towing machine for Wm. Cramp & Sons Co., Philadelphia.
1 No. 5 towing machine for Wm. R. Trigg Co., Richmond, Va.
2 No. 5 towing machines for Townsend & Downey Ship Building & Repair Co., Shooter's Island, N. Y.
1 No. 4 towing machine for Burlee Dry Dock Co., Port Richmond, Staten Island, N. Y.
1 No. 4 towing machine for Arthur Sewall & Co., Bath, Me.
1 No. 5 towing machine for tug Tatoosh, Puget Sound Tug Boat Co., Seattle, Wash.

TOLEDO WHITE LEAD CO.

With increased capital, new machinery, etc., and with the prestige of having already built up quite a business of a marine kind, the Toledo White Lead Co. of Toledo, O., is planning for a larger share of the paint trade among vessel owners. At the last meeting of stockholders, Mr. Geo. E. Hardy, who is very well known in vessel circles around the lakes, was made vice-president of the company and will take an active interest in its affairs, giving special attention to the marine department. Other officers of the company are Chas. E. Sumner, president; W. L. Ashley, secretary; B. Hagaman, general manager and treasurer. Capt. Geo. E. Dailey, who is also well known to vessel men trading to Toledo, has been engaged by the company to sell their marine paints until the opening of navigation. Messrs. Hardy & Dishinger, who are interested in the Toledo White Lead Co., have been in supply business at Toledo for some time past. Mr. Hardy sold goods in Toledo harbor for the H. B. Tobey Oil & Supply Co. for some seven or eight years before going into business for himself. The Toledo White Lead Co. has made a specialty of high-grade vessel paints since they began business nine years ago. Many vessel men are familiar with their goods and speak of them in the highest terms.

Treasury Department, U. S. Life-Saving Service, Washington, D. C., January 20, 1902. Sealed proposals will be received at this office until 2.00 o'clock, p. m., of Tuesday, February 4, 1902, and then publicly opened, for the construction of foundations, retaining walls, etc., for a life-saving station at Buffalo, New York. Specifications and drawings, forms of proposal, etc., can be obtained upon application to the Superintendents of Construction of Life-Saving Stations, 17 State Street, New York City; to the Superintendent of the 10th Life-Saving District, Custom House, Buffalo, New York; to the Assistant Inspector 10th and 11th Life-Saving Districts, Room 204 Postoffice Building, Detroit, Michigan; to the Keeper of the Cleveland Life-Saving Station, Cleveland, Ohio; or to this office. S. I. Kimball, General Superintendent. Jan. 23.

Small Steamer.

For Sale—Finest, fastest and cheapest running and most beautiful small business steamer on the lakes; 23 ft. wide, 100 ft. long; allowed 400 passengers; draws 6½ ft.; price $6,000, one-half cash. Address 479 Sheridan Avenue, Detroit, Mich. Feb. 13.

Passenger Steamer.

For Sale—Small passenger steamer of light draught. Capacity 300 passengers, 100 tons freight. John Stevenson, Detroit, Mich. tf

"Seaboard Steel Castings."

MANUFACTURERS OF "THE ADMIRAL" ANCHOR.

THE LATEST AND BEST STOCKLESS ANCHOR. APPROVED BY LLOYD'S.

ANCHORS CAST AND TESTED ON ORDER, OR STOCK ORDERS PROMPTLY FILLED.

A GUARANTEE OF QUALITY.

OPEN-HEARTH STEEL CASTINGS OF THE HIGHEST GRADE.

FACILITIES FOR CASTINGS UP TO 80,000 POUNDS WEIGHT.

MACHINE WORK AND PATTERNS FURNISHED WHEN REQUIRED.

RAIL OR WATER DELIVERIES.

CAPACITY, 1500 TONS PER MONTH

Seaboard Steel Casting Co.,

CHESTER, PA.

"BENEDICT-NICKEL" Seamless Condenser Tubes are the only ones that resist electrolysis. Far superior to brass or copper.

Our treatise on "Electrolysis of Condenser Tubes" tells why—send for it.

BENEDICT & BURNHAM MFG. CO.

Mills and Main Office, Waterbury, Conn.

New York, 253 Broadway. Boston, 172 High St.

ANNOUNCEMENT.

TO THE TRADE:

Two of the best-informed and most reliable firms of **Patent Attorneys** in the **United States** make us the **following statement:**

The "Little Giant" Reciprocating Piston Air Drills, now being manufactured by the Standard Pneumatic Tool Co. of Chicago, do not infringe in any particular on any Patent for Rotary or other Drills.

We hereby guarantee all purchasers and users of **"Little Giant"** Drills against all liabilities.

We will assume the defense of any litigation against our customers which may result from the sale or use of our drill, and respectfully request the trade to pay no attention to **intimidating circulars** which are sent out for the sole purpose of **attempting to injure** our business.

Yours respectfully,

Standard Pneumatic Tool Co.

General Offices and Works,
AURORA, ILL.

By E. N. HURLEY, President.

LAKE FISH STATISTICS.

An increase of over 9,000,000 in the fish and fish eggs distributed by the government throughout the country and a marked decline in lobster fishing are shown in the annual report of the United States commission of fisheries for the last fiscal year. The total fish and eggs distributed was 1,173,833,400, the principal species being shad, salmon, lake trout, whitefish, pike, perch, lake herring, cod, flatfish and lobsters. In addition to the regular work on the great lakes plans were matured to begin the propagation of lake herring. The collection of trout eggs in Lakes Superior and Michigan, which nearly doubled that of last year, aggregated 224,000,000, from which 19,000,000 fry were hatched. The report says the canvass of the great lakes has been taken up only in 1899, when the yield and value were nearly equal to those of 1890, the largest on record. The total yield was 113,-728,000 lbs., worth $2,611,400. There were 9,670 persons employed in the fisheries and $6,617,000 was invested. The value of the fish and the different lakes, ranges from $1,150,000 in Lake Erie to $100,000 in Ontario. In stocking inland lakes and rivers 160,000,000 eggs were placed in the Missipuoi river in Vermont, 42,000,000 eggs were taken from Lake Erie to Michigan and Missouri, and 229,000,000 eggs were held in Put-in-Bay. Out of these hauls, 240,887 fishes were hatched.

TRADE NOTES.

Plans are being prepared for additional buildings for the Michigan Steel Boat Co. of Detroit. The plans embrace a warehouse, boiler, dynamo and other buildings.

Mr. Reuben C. Hallett, who has a large circle of friends throughout the country, has accepted a position with the Chicago Pneumatic Tool Co.'s eastern sales department.

Mr. C. P. Nicholson of the Nicholson Ship Log Co., Cleveland, O., is at present in New York introducing his perfected log to vessel interests there. He is understood to have met with quite a favorable reception.

Mr. E. C. McKay, formerly of the Pittsburgh Steamship Co., has been elected secretary of the Ohio Rubber Co. of Cleveland. Mr. McKay will have charge of the finances and credits of the Ohio company.

Lewis & Crane of Seattle, Wash., well-known dealers in Washington fir timber, especially for ship building and railroad purposes, have opened an office at No. 18 Broadway, New York city, so as to facilitate dealings with customers in the east. The office is in charge of Mr. E. H. Lewis, a member of the firm. Specialties with Lewis & Crane are long and large timbers, ship spars, decking, ship timbers, railroad and car building material, large dredge spuds and derrick timbers and long fir piling up to 120 ft. or over, as well as long cedar poles up to 80 ft. or over.

The American Steam Gauge & Valve Mfg. Co. of Boston report that their business for 1901 was largely in excess of the previous year, and the outlook for 1902 is more promising than at the same time last year. When they moved into their new works two years ago they doubled their capacity, and still they are now contemplating additions. The demand in this country for this company's gauges and valves has not only increased, but their foreign business is crowding them. They also report that the sale of their Thompson indicator has steadily increased until they are now satisfied that more Thompson indicators are sold than all the other makes combined. They will shortly send out a handsome new calendar.

NEW PNEUMATIC TOOL WORKS.

The Philadelphia Pneumatic Tool Co., 1038 Ridge avenue, Philadelphia, Pa., is about to let contracts for a new building, to be erected on Twenty-first street, below Allegheny avenue, alongside the Philadelphia & Reading Railroad tracks. The shop will be one story, with a basement, 96x130 ft., with side extension for boiler house 24x44 ft. The engine room will be located in the basement, where there will be installed an 80 H.P. engine together with direct-connected generating unit for lighting, etc. The boiler will be 60 in. by 16 ft., of the return tubular type. A round, hollow tile, brick chimney will be 70 ft. in height. The interior construction and roof frame for the building will be of yellow pine with slag roof. The roof will have four large lanterns or sky-lights, extending transversely of the building, thus allowing plenty of light over the entire floor area. The main floor will be free from partitions except in one corner where the offices are located. The building will be ready for occupancy about May 1.

This new plant will be easy of access from the central part of the city by train on the Philadelphia & Reading road from the Reading terminal, Twelfth and Market streets to Twenty-second street station on the Norristown division, or from Broad street station to Westmoreland station on the Germantown division of the Pennsylvania railroad; or it can be reached by trolley cars of the Eighteenth and Twentieth street lines, which run out Sansom street.

The shop will be equipped with steam heating plant, modern toilet arrangements, lockers for the men and everything to make it a complete modern machine shop in every particular.

A British admiralty chart, Midland section of Georgian bay, will be sent, postpaid, to any address for $1.25; regular price $1.75. Size of sheet 3x4 ft. The Marine Review Pub. Co., Perry-Payne building, Cleveland. Chart of the whole bay on one sheet at the same price.

A chart of Ashtabula harbor in colors has just been issued by the engineer officers in charge of the lake survey and may be had from the Marine Review.

The 1901 catalogue of Marine Iron Works, station A, Chicago, is sent free on their receiving request. It is descriptive of their product, so far as the special line of work in which they are engaged can be catalogued. 2

BELLEVILLE GENERATORS

Grand Prix 1889 — Hors Concours 1900
Originated 1849 — Latest Improvements 1896

Number of Nautical Miles made each year by Steamships of the Messageries Maritimes Co., Provided with Belleville Generators—Since their Adoption in the Service.

Year.	Australien	Polynésien	Armand Béhic	Ville de la Ciotat	Ernest Simons	Chili	Cordillère	Laos	Indus	Tonkin	Annam	Atlantique
1890	67,728	2,460										
1891	68,247	68,331	204									
1892	68,247	68,403	69,822	23,259								
1893	68,379	68,343	68,286	68,247								
1894	68,439	68,367	68,574	68,439	37,701							
1895	68,673	68,766	68,739	68,808	40,887	28,713						
1896	69,534	92,718	69,696	69,549	62,205	63,153	40,716					
1897	68,250	69,606	92,736	69,555	62,235	76,110	63,357	43,146				
1898	70,938	69,534	69,552	69,597	62,526	63,240	63,240	62,553	63,954	22,707		
1899	69,534	69,615	67,431	90,405	60,246	62,778	62,868	52,344	54,855	44,007	22,884	
1900	69,534	67,494	69,744	69,564	61,719	62,382	62,502	51,471	53,373	62,016	63,066	52,140
Total	757,503	713,637	644,784	597,423	387,519	356,376	292,683	209,514	172,182	128,730	85,950	52,140

ATELIERS ET CHANTIERS DE L'ERMITAGE, À ST. DENIS (SEINE), FRANCE.
WORKS AND YARDS OF L'ERMITAGE AT ST. DENIS (SEINE), FRANCE.

TELEGRAPHIC ADDRESS: BELLEVILLE, SAINT-DENIS-SUR-SEINE.